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ABSTRACT

The Jonesboro Area Vocational High School was the Arkansas pilot site for the Southern Regional Education Board (SREB) initiative to improve the basic competencies of high school vocational students. The project aimed to revise vocational courses to incorporate academic content, to revise course requirements, and to encourage vocational and academic teachers to work together. Two academic teachers responsible for integrating academic content in vocational education taught modules, helped vocational instructors develop instruction, and provided remediation. Staff development for vocational and nonvocational teachers, counselors, and administrators included teaching basic skills and applied learning courses. An advisory committee assisted with student follow-up and provided assistance in evaluation. Evaluation measures included the following: assessment of student achievement in 1988 and 1990 in reading, mathematics, and science; annual studies of vocational program completers; student follow-up surveys; and administrator, counselor, and teacher surveys. Findings were as follows: students met or exceeded scores set as goals; student enrollment in specific mathematics and science courses increased; and a cooperative attitude of students and teachers was noted. (Appendixes, amounting to about three-fourths of the report, include 1988 and 1990 results of an assessment of reading, mathematics, and science in the Jonesboro Area Vocational High School and the 1990 site report.) (YLB)

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FINAL REPORT

INCORPORATING APPLIED LEARNING TECHNIQUES
OF BASIC SKILLS INTO THE
SECONDARY VOCATIONAL EDUCATION CURRICULUM

Conducted by

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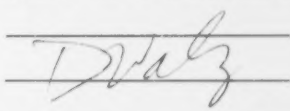
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INTRODUCTION

The Area Vo-Tech High School serves secondary vocational students from fifteen public schools in a four-county area. The vocational skills training program of the Area Vo-Tech High School offers area students specific skills training in thirteen trades. These students have a wide range of ability in academic competency areas of mathematics, science, and communications skills.

In 1985 the Area Vo-Tech High School implemented a program improvement project to increase the reading, mathematics, and communication skills of secondary vocational students to prepare them for employment or for further study at the post secondary level. Persons who lack basic academic skills will remain in dead end jobs and will be unable to adjust to the shifting job market in a rapidly changing economy. Vocational education can make a vital contribution to an upgraded secondary school curriculum if it is improved and refocused so that the development of basic academic skills is a high priority. Secondary vocational education offers an alternative approach to these skills especially for students who grasp material more readily through application (applied learning) than through abstract thinking.

The Southern Regional Education Board (SREB) State Vocational Education Consortium was formed in 1987 as a six year effort to develop, apply, evaluate, and advance approaches

designed to strengthen the basic competencies--communications, mathematics, science, critical thinking, and problem solving--of high school students enrolled in vocational education.

OBJECTIVES

The Area Vo-Tech High School in Jonesboro is the Arkansas pilot site for the SREB initiative. The 39 pilot sites in the 15 states involved in the Consortium effort believe in two major realities--the increasingly higher levels of skills required in the workplace and the large numbers of students leaving high school before graduation--can effectively be addressed by developing strategies that will provide a more challenging vocational and academic curriculum for the vast numbers of high school students now enrolled in the general curriculum. Such a curriculum can maintain or, in some cases, rekindle students' interest in learning; motivate them to graduate from high school; provide them with the levels of knowledge in basic academic competencies and technical skills that will enable them to continue to learn and adapt in today's ever-changing workplace; and provide them with the levels of knowledge and skills necessary to continue their education at a postsecondary institution either immediately after graduation from high school or at a later date.¹

The strategies being implemented are: establishing higher expectations for students in both academic and vocational classes; revising vocational programs to reinforce

¹ Bottoms, Gene, "Jonesboro AVTHS Pilot Site Report Assessment of Reading, Mathematics, and Science", Educational Testing Service, (Princeton, New Jersey, 1990).

communications, mathematics, and science concepts; revising academic courses to teach the essential concepts from the college preparatory curriculum through an applied process; requiring vocational majors to complete three courses each in mathematics and science, with at least two credits in each area being equivalent in content to courses offered in the college preparatory program, and to complete at least four courses in a vocational major and two related courses; encouraging vocational and academic teachers to work together in preparing students for continued learning on the job or in school; providing guidance and counseling services that help students plan and pursue a more challenging program of studies; and providing extra help that will enable students to complete successfully a program of studies that include higher level academic content.² The Area Vo-Tech High School as a part of the SREB Consortium effort worked to close the gap in reading, mathematics, and science achievement of vocational completers (as measured by the National Assessment of Educational Progress) between 1988 and the end of the Program Improvement Project in 1991. Such a margin of increase would indicate that statistically significant improvements in student achievement have occurred.

A variety of measures, both formal and informal, were used to evaluate the success of the project. Informal evaluation measures included on-site monitoring and program assistance by

2 Ibid.

personnel employed by the Vocational and Technical Education Division, Arkansas Department of Education and the administration of the Jonesboro Public School System. Formal evaluation measures included: the assessment of student achievement in 1988 and 1990 in the subjects of reading, mathematics, and science using the National Assessment of Educational Progress; annual studies of the transcripts of students who complete vocational programs to determine the number and types of courses taken; student follow-up surveys--administered 10 to 14 months after graduation from high school--to determine what career and educational decisions these students have made to allow them the opportunity to comment on their preparedness for employment or further study; surveys of administrators, counselors, and vocational and non-vocational teachers at the pilot sites;³ and a formal on-site review conducted by personnel from the Southern Regional Education Board and personnel from other consortium states.

Specific objectives of the project are as follows:

1. To stress vocational completers' achievement of basic competency goals as defined by the Southern Regional Education Board.
2. To recommend that students designated as vocational completers demonstrate the level of basic competencies needed to enter related employment and continue to learn on the job or to be prepared to begin some form of postsecondary education.

3 Ibid.

3. To develop curriculum and instructional strategies through a committee of academic and vocational teachers for strengthening basic competencies of students enrolled in vocational courses that include: teaching college preparatory content through applied science, mathematics and/or communication courses infusing applied teaching methods into existing academic and general courses; coordinating the teaching of general and vocational instruction; revising vocational curriculum and instruction so that greater emphasis is placed on the math, science, communications and technical concepts and skills that underlie the competencies of an occupationally specific area.

4. To suggest academic general, and related vocational courses for each vocational offering.

5. To recommend that all vocational completers have keyboarding and computer literacy competencies.

6. To assist, through a counselor committee, all students in developing a four-year educational plan before or during the ninth grade. The plan is to be reviewed and revised when needed.

7. To allow full or partial general or academic credit up to two units to be earned through completion of a vocational concentration, when a joint academic and vocational committee finds that vocational programs and courses have equal content and time, or equal competencies relative to general or academic courses.

8. To require at least four units in a vocational

concentration for vocational completers.

9. To establish prerequisites in reading and math for enrollment in an occupationally specific program and to provide students who fail to meet the prerequisites with the following services: a. developmental or remedial studies; b. an individualized educational plan (I.E.P.) and a monitoring system; c. developing, implementing, and coordinating vocational and academic instruction.

10. To design and implement an intensive staff development program for academic and vocational teachers.

11. To use an evaluation plan that includes the use of state tests currently used to measure basic competencies as well as the "common basic competency test" developed by the Southern Regional Education Board.

PROCEDURES

The challenge of this project was to design a realistic and workable program to increase the competencies of the students and strengthen the content of both academic and vocational courses. The responsibility for integrating academic content in vocational education courses was given to two academic teachers, one certified in mathematics, the other with expertise in reading. These two teachers worked with 13 vocational instructors. Sometimes the academic instructors taught modules within vocational classrooms--on specific math topics, for instance, or technical writing or reading. Sometimes the academic teachers helped vocational instructors develop the instruction in academic competencies in their courses. Frequently vocational instructors thought of ways they could reinforce academic material, and having academic specialists at hand helped them put their ideas into practice. Sometimes academic and vocational teachers did team teaching. Also, academic teachers provided remediation for students when it was deemed necessary.⁴

Staff development for vocational and non-vocational teachers, counselors, and administrators was an integral part of the project. Staff development activities included: teaching

⁴ Grubb, W. Norton, "The Challenge to Change", Vocational Education Journal, February, 1991.

reading in the content area, teaching technical reading, writing for learning, learning styles, applied learning courses, and establishing higher expectations for vocational students. After a minimum of six hours of observation and participation in vocational classes at the Area Vo-Tech High School, mathematics, science, and English teachers of the 15 "feeder" high schools identified academic concepts that were embedded in vocational curriculum. Mathematics and science teachers from the "feeder" high schools were "teamed" with vocational teachers to identify academic concepts in vocational courses and applied learning concepts in academic courses.

Applied Mathematics I was implemented at the Area Vo-Tech High School. Students enrolled in Applied Mathematics I received a Carnegie Unit in Mathematics toward graduation. Many students were enrolled in Applied Mathematics in lieu of Practical Math or General Math. During the 1990-1991 school year three "feeder" high schools implemented Applied Mathematics I as a course offering.

Students who met specific requirements were awarded a Carnegie Unit in General Science through enrollment in Allied Health Occupations Class. Applied Biology/Chemistry was implemented through integration into Horticulture and Allied Health Occupations classes.

A multi-media "Enrichment" Lab provided remediation and extension for students. Computer software, video tapes, filmstrips, and resource materials were customized to provide

mathematics, science, communications skills, reading, computer literacy, job skills, and employability skills competencies for the thirteen vocational offerings. A full-time aide was employed to assist students and manage the "Enrichment" Lab.

One of the most successful activities of the project was the annual "Quiz Bowl" conducted at the Area Vo-Tech High School. Questions used for the "Quiz Bowl" encompassed the subjects of history, geography, English, technical reading, physical science, biology, chemistry, algebra, geometry, spelling, and general knowledge.

Throughout the duration of the project the two academic teachers employed by the Area Vo-Tech High School designed and presented staff development activities throughout Arkansas and the United States. When other vocational and/or non-vocational schools established applied learning programs the two academic teachers served as consultants.

An Advisory Committee composed of members from business and industry; teachers, administrators, and counselors of "feeder" high schools; parents, and former students was established to offer advice, suggestions, and recommendations on long-range planning, relevancy of existing vocational programs, provide a channel of communications, assist with student follow-up, and provide assistance in evaluation.

Vocational competencies of students enrolled in the Area Vo-Tech High School are assessed using a competency test developed by personnel at the University of Arkansas.

Mathematics, science, and communications competencies are assessed using the Adult Basic Learning Examination, the Metropolitan Achievement Test, and the National Assessment of Educational Progress.

After an aptitude, ability, and needs assessment, four year educational plans are developed for students in the eighth grade. During the 1990-1991 school year a "Task Force" was formed to develop a program of study for students in the "academic track" or the "vocational track". The Tech Prep Curriculum is expected to be implemented throughout the State of Arkansas.

The physical facilities used in this project were those provided by the Area Vo-Tech High School.

EVALUATION

A variety of measures were used to evaluate the progress of the Area Vo-Tech High School toward meeting the goals and objectives of the project. These measures included:

the assessment of student achievement in 1988 and 1990 in the subjects of reading, mathematics, and science using the National Assessment of Educational Progress;

annual studies of the transcripts of students who complete vocational programs to determine the number and types of courses taken;

student follow-up surveys--administered 10 to 14 months after graduation from high school--to determine what career and educational decisions these students have made and to allow them the opportunity to comment on their preparedness for employment or further study;

and surveys of administrators, counselors, and vocational and non-vocational teachers at the pilot sites.⁵

The 1990 National Assessment of Educational Progress of secondary vocational completers followed a baseline assessment--conducted in the spring of 1988. The baseline information was collected for comparison with national data and with the accomplishments that 1990 vocational completers made as

5 Bottoms, Gene, "Jonesboro Area Vo-Tech High School Pilot Site Report Assessment of Reading, Mathematics, and Science", Educational Testing Service, Spring, 1990.

a result of program and structural changes at the site. Any references to national comparisons reflect the achievement scores of 17-year-old public high school students from a national sample of students assessed with NAEP in the spring of 1986.⁶

The following are highlights from the results of the 1990 SREB Vocational Consortium assessment of vocational completers at the Area Vo-Tech High School in Jonesboro, Arkansas.

. The overall reading, mathematics, and science achievement scores of 1990 Area Vo-Tech High School students were higher than those of Area Vo-Tech High School students in 1988. As a result of these improvements, Area Vo-Tech High School completers met or moved beyond the SREB Consortium Goals for each of the three subject areas. (See appendix.)

. In 1990, with the exception of reading scores for White students, both Black and White students at the Area Vo-Tech High School posted significant increases when compared to 1988 results for each of the three subject areas. In stark contrast to national data, the performance of Black students at the Area Vo-Tech High School in all three subject areas was at or above that of White students. (See appendix.)

. By far, the largest percentage of vocational completers at the Area Vo-Tech High School were enrolled in technical programs. Students with the highest reading achievement scores were enrolled in business and office programs; for mathematics,

6 Ibid. p.1.

the highest scores were posted by students in marketing programs; and for science, the highest scores were achieved by students in marketing, trade and industrial, and technical programs. (See appendix.)

. In the subject of mathematics, almost 85% of the 1990 Area Vo-Tech High School completers had taken first-year algebra, about 62% had taken geometry, and about 44% had completed a second-year algebra course; enrollment in these three courses increased significantly from 1988 levels. In none of the specified mathematics courses did achievement scores improve when comparing 1988 to 1990. For science, almost 100% of the 1990 Area Vo-Tech High School completers indicated that they had taken biology, yet fewer than 20% had taken chemistry and less than 5% reported completing physics. Area Vo-Tech High School students completing general science and biology posted higher scores when compared to 1988 data. (See appendix.)

. A little more than one-third of the Area Vo-Tech High School completers often stressed the importance of reading, which was significantly below the SREB Consortium average; responses for mathematics and science were well above the SREB averages. (See appendix.)

. Very little progress was made from 1988 in the percentage of 1990 Area Vo-Tech High School completers who reported that they usually did not have any homework assigned (a decrease of 2%, from 46% in 1988 to 44% in 1990.) Less than one-third of the Area Vo-Tech High School completers reported spending about one

hour on homework each day. (See Appendix.)⁷

Another important aspect of the evaluation of the project was conducted during the 1988-89 school year. High school transcripts were collected to determine the number and types of courses completed by students. Student follow-up surveys were administered to vocational completers 10 to 14 months after graduation. The surveys document students' educational and employment activities following high school graduation and provide them with an opportunity to comment on their sense of preparedness after graduation. In addition to these assessments, a secondary school personnel survey was given to school administrators, counselors, vocational and non-vocational teachers at each site to obtain their opinions about the integration of academic and vocational education and to assess their efforts in this area.⁸

Students enrolled at the Area Vo-Tech High School completed an average of 22 credits in academic, vocational and other subjects. This averages to over 5 courses per year over four years. More than one-half (12 credits) of the courses taken by SREB students were in academic subjects. Thirty-five percent of all academic credits were in English, 23 percent were in mathematics, and 20 percent were in science. The remaining academic credits were completed in other academic subject such

7 "Jonesboro Area Vo-Tech High School Pilot Site Report", Educational Testing Service, Spring, 1990.

8 Jonesboro Vocational High School Site Report, Southern Regional Education Board, 1990.

as social studies, foreign languages, and fine arts.⁹

On average students completed 4.2 credits in English. Most English courses taken were in general English.¹⁰

Jonesboro Vocational students completed just under three years of mathematics. Seventy percent took Algebra I. Twenty-seven percent took Algebra II. Twenty-eight percent took Geometry. Five percent of the vocational completers reported taking more advanced math courses in either Trigonometry or Calculus.¹¹

Jonesboro Vocational students completed over two years of science. Coursework in the biological sciences--general biology, advanced biology, zoology, and botany--accounted for 0.9 science credits. About 1.1 credits were taken in general, physical, and earth science. Students completed less than 0.1 credits in Chemistry and Physics.¹²

To distinguish between vocational courses that offer general or introductory skills and courses designed to impart skills and training in a specific occupational area, data were collected on the number of general or pre-vocational courses taken and on the number of occupationally specific courses completed in the student's vocational speciality. Students from the Area Vo-Tech High School completed about 3.4 credits in

9 Ibid., p.5.

10 Ibid., p.5.

11 Ibid., p.7.

12 Ibid., p.8.

pre-vocational courses. Thirty-five percent completed 4 or more credits in their vocational specialty. Twenty-eight percent fulfilled the mathematics requirement of the SREB consortium. Thirteen percent of completers met the goals set for science education. Seven percent met both the math and science goals.¹³

Vocational completers engaged in a wide variety of activities after finishing high school. Eighty-five percent worked full or part time. Thirty-five percent continued their education in some form of postsecondary institution. About forty-nine percent of the vocational completers who were enrolled in postsecondary education attended a four year college or university. Forty-two percent enrolled in a postsecondary vocational school. Five percent enrolled in a two-year community or junior college. Three percent enrolled in a state or federal job training program. Eight percent enlisted in the military. Approximately 53 percent of the students who went on to further education were enrolled in postsecondary programs related to their high school vocational program.¹⁴

Eighty-five percent of the completers worked at some point after leaving high school. Sixty-five percent were employed full-time. Fifteen percent were employed half-time. Twenty percent worked part-time or less than 20 hours a week. Approximately 55 percent of the students who worked were employed in sales, administration, clerical, or service

¹³ Ibid., pp. 8-10.

¹⁴ Ibid., pp. 12-14.

positions. Fourteen percent of the students who worked were employed as machine operators. Twenty-eight percent of the vocational completers reported being out of a job and looking for work at some time during the six months after graduation. The average amount of time spent looking for a job was 11 weeks.¹⁵

The student follow up survey included the students' perceptions of their high school experience. Fifty-nine percent of the vocational completers indicated that the vocational teachers in their school placed the right level of emphasis on reading and interpreting technical materials. About 40 percent thought more emphasis should be placed on reading skills in their vocational programs. One percent thought that their vocational programs should place even less emphasis on applied reading skills. Sixty-four percent of the vocational completers felt that their vocational teachers placed the right amount of emphasis on technical writing including business letters and reports. Thirty-one percent felt more emphasis should have been placed upon teaching these skills. Fifty-one percent felt that their vocational teachers should have placed greater emphasis on teaching scientific principles in an applied setting. Forty-four percent felt that their vocational program had the right amount of emphasis on applied science.¹⁶

As part of the evaluation effort, both vocational and

¹⁵ Ibid., pp. 12-18.

¹⁶ Ibid.

non-vocational teachers were asked to respond to a personnel survey describing their attitudes, behaviors, and expectations about integrating vocational and academic coursework. Fifty percent of the non-vocational teachers agreed with the statement that a primary purpose of secondary vocational education is to prepare youth to enter employment related to their school work with the capacity to learn on the job or in some form of postsecondary education. Forty-five percent of the vocational teachers agreed with the statement that a primary purpose of secondary vocational education is to prepare youth to enter employment related to their school work with the capacity to learn on the job or in some form of postsecondary education. Forty-five percent thought a primary purpose of secondary vocational education is to train youth for entry-level employment. All non-vocational teachers indicated that it is quite or extremely important to reinforce student reading skills. Ninety percent of vocational teachers felt the reinforcement of reading skills quite or extremely important. All non-vocational teachers indicated that it is quite or extremely important to reinforce students' writing skills. Seventy-three percent of non-vocational teachers indicated that it is quite or extremely important to reinforce students' math skills, and approximately the same percentage found the reinforcement of science quite or extremely important. All of the vocational teachers agreed that the reinforcement of math skills is extremely or quite important. Ninety-one percent felt

the teaching of science skills was extremely important. On the average all vocational and non-vocational teachers completing the survey felt that the learning of academic skills in a vocational context was quite important. Approximately fifty percent of the non-vocational teachers said that they could reinforce students' reading and writing skills well or fairly well. Seventy-three percent of the vocational teachers said they could reinforce students' reading skills well or fairly well, and all said they could reinforce writing skills well or fairly well. Sixty-four percent of all vocational teachers, and 100 percent of all non-vocational teachers said that they could reinforce students' math skills well or fairly well. Slightly more non-vocational teachers (33%) report spending time meeting with vocational teachers to discuss and prepare instructional activities, than do vocational teachers (30%) report spending time meeting with non-vocational teachers.¹⁷

¹⁷ Ibid.

CONCLUSIONS AND RECOMMENDATIONS

In the lapsed time of the project, students enrolled in the Area Vo-Tech High School met or exceeded the scores set as goals by the Southern Regional Education Board. This commendable accomplishment occurred in a sample which was somewhat atypical of the total consortium population by racial/ethnic origin and gender.¹⁸

Since the beginning of the project student enrollment in specific mathematics and science courses has increased. Another positive aspect of the project is the cooperative attitude of students and teachers who participated in the project. Students reported their teachers were interested in their work and in their students.¹⁹

One of the weaker aspects of the project was implementing a program of study. This may be attributed to the fact that this initiative involves 15 separate school administrations, faculties, and community populations. A low percentage of students reported encouragement to enroll in more difficult classes. A decreased academic planning assistance by the high school counselors was noted in 1990. Further, the 1990 students reported a low level of parental assistance in planning a

¹⁸ George Herrington, "Jonesboro Area Vocational Technical School" (paper presented to SREB, Atlanta, Georgia, March, 1991).

¹⁹ Ibid.

program of studies.²⁰

The following recommendations are verbatim from "Jonesboro Area Vocational Technical School" an indepth study of the site:

1. To expand the student data base with pre (entering) and post (completion) measures. This could serve as a criterion of individual student progress as well as indentifier of the more successful feeder schools.
2. To continue and expand the information flow between inter-instructional units, specifically targeting counselors for inclusion.
3. To develop a plan to enlist more parental involvement for the purpose of information dissemination, encouraging student progress and student goal setting.
4. To develop a system of reward or recognition for vocational student academic success.
5. To make earlier contact with students and parents (pre high school) concerning academic programs and post secondary planning.
6. To continue and enhance a public relations effort aimed to the economic community and the general public.²¹

²⁰ Ibid.

²¹ Ibid.

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APPENDICIES

JONESBORO AREA VOCATIONAL HIGH SCHOOL

PILOT SITE REPORT

ASSESSMENT OF READING, MATHEMATICS, AND SCIENCE

SOUTHERN REGIONAL EDUCATION BOARD

VOCATIONAL EDUCATION CONSORTIUM PROJECT

SPRING 1988

Preface

The Southern Regional Education Board (SREB) Vocational Education Consortium conducted an assessment in reading, mathematics, and science in the spring of 1988. The assessment, which contained questions previously administered to a national sample of students by the National Assessment of Educational Progress (NAEP), was initiated to collect baseline information about students who were completing their vocational education. The information was collected for comparison with national data and with progress subsequent students would make as a result of program and structural changes introduced at pilot sites.

The 1988 assessment report is in two parts. This document, the first part, provides a context for studying the detailed results of the assessment and gives a brief overview of results of student performance at your site. It also suggests ways in which the data can be studied further and ends with the background survey questions your students answered as part of the assessment. The second document is a compendium of performance data for each question. The data are presented for the total student population tested, and for gender, racial, and ethnic subgroups, and type of vocational education program in which the participating students are enrolled. An archival data tape containing the output for each participating site in the Consortium project is on file at the SREB office in Atlanta, Georgia.

Questions related to this report or the compendium of performance data may be directed to Douglas Rhodes, The Nation's Report Card, (800) 223-0267 or to NAEP, Educational Testing Service, Princeton, New Jersey 08541. Questions about the Vocational Education Consortium project may be directed to your state vocational education coordinator or to Gene Bottoms, SREB, (404) 875-9211.

Contents of This Report

This report presents information for studying and interpreting the detailed results of the assessment. It contains the following:

1. A brief overview of the results of student performance with comparisons to national NAEP results.
2. A description of the objectives and content of the reading, mathematics, and science assessment.
3. A discussion of how the assessment results presented in the compendium of site performance data can be used.
4. A list of student survey questions given to students as part of the assessment.

Introduction

In 1986, thirteen member states of the Southern Regional Education Board formed the SREB-State Vocational Education Consortium. The purpose of this Consortium is to advance, apply, and evaluate approaches intended to strengthen the development of the basic competencies--communication, science, mathematics, critical thinking, and problem solving--of students enrolled in vocational education programs. Representatives of these 13 member states (Alabama, Arkansas, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia) believed that the academic skills of students enrolled in vocational education programs could be improved. The strategies being used to improve the basic competencies of students pursuing vocational studies include: a double-purpose goal of preparation for employment and further learning in either a work or educational setting; requiring students to complete a more rigorous program of vocational and academic studies; increasing the amount of time vocational students spend explicitly reinforcing higher-level basic competencies; expanding the use of applied instructional approaches in academic courses; special courses for targeted skill development; and focused counseling for course selection. The intent is to enhance the academic content of the vocational curriculum and the vocational content of the academic curriculum so that the full potential of students can be realized.

Pilot sites for model programs were established in each state, with a total of over 30 sites participating in the six-year Consortium project. Each site, in collaboration with state vocational education and non-vocational leaders, will develop and implement a plan for strengthening its vocational, communications, mathematics, and science curriculum and will share its findings with other members of the Consortium. Periodically, staff development conferences are held as a forum for the exchange of ideas and the consideration of new initiatives. An integral part of the Consortium's initiative is assessing the progress of designated sites in achieving their goals. A variety of measures will be used, including the assessment of academic achievement in reading, mathematics, and science. The Consortium is using a portion of the National Assessment of Educational Progress (NAEP) achievement questions as a means for gauging the educational progress of students in these model programs and comparing their performance to that of students nationally. The NAEP results and the results of academic achievement from this assessment are reported for groups of students and are not designed for the evaluation of individual student performance. Other assessment measures will include a transcript analysis of vocational completers to determine the number and type of courses taken and a follow-up study to determine the post-high school activities of students who have completed a vocational program of study.

Dr. Gene Bottoms
Director, State Vocational Education
Consortium
Southern Regional Education Board

Finding Meaning In These Results

A BRIEF WORD ABOUT INTERPRETATIONS

Interpreting the assessment results--attempting to put them into a "real-world" context, advancing plausible explanations of effects, and suggesting possible courses of action--will always be an art, not a science. No one can control all the possible variables affecting a survey. Also, any particular finding may be explained in many ways or perhaps not at all. Further, the findings presented here and in the item analyses in the compendium of performance data present comparisons between student performance and other variables such as course enrollment, student attitudes, and laboratory or computer experiences. These relationships are statistical relationships only and should not be mistaken

for cause-and-effect statements. Nevertheless, these relationships do provide insights into the importance of various indicators to performance. In order to bring meaning to these data, teachers and administrators who understand local conditions and possibilities need to apply their professional judgment, knowledge, and experience to these findings. Only in these contexts can comparisons or interpretations stand the test of reason.

NO COMPARISONS ACROSS SUBJECT AREAS

Each of the assessments in reading, mathematics, and science has been placed on a separate scale. The reading scale has a range of 0 to 100 with a mean of 50 and a standard deviation of 10. The mathematics and science scales, however, have a range from 0 to 500. While these two scales have the same apparent range, similar means (250), and weighted standard deviations (50), it is NOT appropriate to compare scores on one scale with scores on the other. Although the scales appear to have the same numbers, a 350 on the mathematics assessment does not suggest accomplishment or performance equal to 350 on the science assessment. Not only were different test development assumptions followed for each assessment, but the scaling populations used when the respective scales were established and the resulting distributions of scores for the three assessments were different as well. As a consequence, when the scores were fixed on each of the scales, no real or implied link was made between the mean proficiencies across the three subject areas.

LEVELS OF PROFICIENCY

Though comparing average levels of performance with national levels or with levels of population subgroups provides an interesting and informative way to study results, these comparisons say little about what students can and cannot actually do. Therefore, it is important to go beyond the numbers or mean scores and understand what behaviors or activities are characteristic of students who have achieved various levels of proficiency. NAEP has defined five levels of performance for each of the three subject areas assessed by the SREB project. Although proficiency levels above and below this range could theoretically have been defined, so few students in the national assessment performed at the extreme ends of the scales that it was not practical to do so.

To characterize the proficiency levels, subject-matter specialists analyzed the types of items that discriminated between adjacent performance levels and described the skills held by students performing at each

of the five anchor points. The description of each of these levels is based on the assessment results and reflects the interaction of knowledge, skills, and strategies that makes performance at that level possible. What follows is a description of each of the levels for reading, mathematics, and science. A more complete description of the levels and questions that further exemplify them can be found in the appropriate NAEP Report Card publication.

LEVELS OF READING PROFICIENCY

Level 30 -- Rudimentary

Readers who have acquired rudimentary reading skills and strategies can follow brief written directions. They can also select words, phrases, or sentences to describe a simple picture and can interpret simple written clues to identify a common object. Performance at this level suggests the ability to carry out simple, discrete reading tasks.

Level 40 -- Basic

Readers who have learned basic comprehension skills and strategies can locate and identify facts from simple informational paragraphs, stories, and news articles. In addition, they can combine ideas and make inferences based on short, uncomplicated passages. Performance at this level suggests the ability to understand specific or sequentially related information.

Level 50 -- Intermediate

Readers with the ability to use intermediate skills and strategies can search for, locate, and organize information they find in relatively lengthy passages and can recognize paraphrases of what they have read. They can also make inferences and reach generalizations about main ideas and author's purpose from passages dealing with literature, science, and social studies. Performance at this level suggests the ability to search for specific information, interrelate ideas, and make generalizations.

Level 60 -- Adept

Readers with adept reading comprehension skills and strategies can understand complicated literary and informational passages, including material about topics they study at school. They can also analyze and integrate less-familiar material and provide reactions to and explanations of text as a whole. Performance at this level suggests the ability to find, understand, summarize, and explain relatively complicated information.

Level 70 -- Advanced

Readers who use advanced reading skills and strategies can extend and restructure the ideas presented in specialized and complex texts, such as scientific materials, literary essays, historical documents, and materials similar to those found in professional and technical working environments. They are also able to understand the links between ideas, even when those links are not explicitly stated, and to make appropriate generalizations even when text lacks clear introductions or explanations. Performance at this level suggests the ability to synthesize and learn from specialized reading materials.

LEVELS OF MATHEMATICS PROFICIENCY

Level 150 -- Simple Arithmetic Facts

Learners at this level know some basic addition and subtraction facts, and most can add two-digit numbers without regrouping. They recognize simple situations in which addition and subtraction apply. They also are developing rudimentary classification skills.

Level 200 -- Beginning Skills and Understanding

Learners at this level have considerable understanding of two-digit numbers. They can add two-digit numbers but are still developing an ability to regroup in subtraction. They know some basic multiplication and division facts, recognize relationships among coins, can read information from charts and graphs, and use simple measurement instruments. They are developing some reasoning skills.

Level 250 -- Basic Operations and Beginning Problem Solving

Learners at this level have an initial understanding of the four basic operations. They are able to apply whole number addition and subtraction skills to one-step word problems and money situations. In multiplication, they can find the product of a two-digit and a one-digit number. They can also compare information from graphs and charts and are developing an ability to analyze simple logical relations.

Level 300 -- Moderately Complex Procedures and Reasoning

Learners at this level are developing an understanding of number systems. They can compute with decimals, simple fractions, and commonly encountered percents. They can identify geometric figures, measure lengths and angles, and calculate areas of rectangles. These students are also able to interpret

simple inequalities, evaluate formulas, and solve simple linear equations. They can find averages, make decisions on information drawn from graphs, and use logical reasoning to solve problems. They are developing the skills to operate with signed numbers, exponents, and square roots.

Level 350 -- Multistep Problem Solving and Algebra

Learners at this level can apply a range of reasoning skills to solve multistep problems. They can solve routine problems involving fractions and percents, recognize properties of basic geometric figures, and work with exponents and square roots. They can solve a variety of two-step problems using variables, identify equivalent algebraic expressions, and solve linear equations and inequalities. They are developing an understanding of functions and coordinate systems.

LEVELS OF SCIENCE PROFICIENCY

Level 150 -- Knows Everyday Science Facts

Students at this level know some general scientific facts of the type that can be learned from everyday experiences. They can read simple graphs, match the distinguishing characteristics of animals, and predict the operation of familiar apparatus that work according to mechanical principles.

Level 200 - Understands Simple Scientific Principles

Students at this level are developing some understanding of simple scientific principles, particularly in the life sciences. For example, they exhibit some rudimentary knowledge of the structure and function of plants and animals.

Level 250 -- Applies Basic Scientific Information

Students at this level can interpret data from simple tables and make inferences about the outcomes of experimental procedures. They exhibit knowledge and understanding of the life sciences, including a familiarity with some aspects of animal behavior and of ecological relationships. These students also demonstrate some knowledge of basic information from the physical sciences.

Level 300 -- Analyzes Scientific Procedures and Data

Students at this level can evaluate the appropriateness of the design of an experiment. They have more detailed scientific knowledge and the skill to apply their knowledge in interpreting information from text and graphs. These students also exhibit a growing understanding of principles from the physical sciences.

Level 350 -- Integrates Specialized Scientific Information

Students at this level can infer relationships and draw conclusions using detailed scientific knowledge from the physical sciences, particularly chemistry. They also can apply basic principles of genetics and interpret the societal implications of research in this field.

OVERVIEW OF SITE RESULTS

This part of the report presents the major findings of the SREB Baseline Assessment of students completing their area of concentration in vocational education (four Carnegie units) at Jonesboro Area Vocational High School. This review is necessarily a summary of the findings because the information found in the Compendium of Performance Data that accompanies this report is comprehensive and detailed. Therefore, readers are encouraged to study the Compendium for a full understanding of the results.

The Overview is divided into four parts. The Attitudes and Plans section highlights several of the questions presented in the Student Survey section of the assessment. A complete set of the questions can be found in the Appendix of this report. The other three sections present summary findings for the subject areas of reading, mathematics, and science, respectively.

ATTITUDES AND PLANS

Students were asked to respond to questions about their beliefs, attitudes, and their perceptions about how their teachers viewed their teaching tasks (Table 1).

Table 1: Attitudes Toward School, Teachers, and Coursework

School: Jonesboro Area Vocational High School		
	Percent	
<u>Positive Statements</u>	<u>Agree</u>	<u>Disagree</u>
Most teachers enjoyed teaching the classes in which I was enrolled.	89.5	10.5
Most teachers took the time to relate subject content to the real world.	74.8	25.2
Most courses were exciting and challenging.	64.5	35.5
<u>Negative Statements</u>		
The school did not care about me and was unwilling to listen to me.	11.2	88.8
Most teachers did not expect or encourage me to do well in school.	12.5	87.5
Most courses repeated content that had been previously learned.	55.9	44.1

At Jonesboro a large proportion of students (89.5 percent), believed that their teachers enjoyed teaching. Most also believed that teachers related the course content to real-world contexts. A majority of students found their courses exciting and challenging, and most students denied that the school did not care about them or was unwilling to listen to them. However, about half the students indicated that their courses repeated content they had already mastered.

Only a small percentage of students at Jonesboro thought that teachers never stressed the basic skills of reading, writing, mathematics, and science (Table 2).

Table 2: Teacher Emphasis on Basic Skills

School: Jonesboro Area Vocational High School				
	Percent			
	<u>Never Stressed</u>	<u>Seldom Stressed</u>	<u>Often Stressed</u>	<u>Don't Recall</u>
Reading	15.2	27.2	39.7	17.9
Writing	17.2	27.8	41.7	13.2
Mathematics	13.8	18.4	57.9	9.9
Science	27.8	25.2	29.1	17.9

About 58 percent reported that their teachers "often stressed" mathematics; slightly fewer said the teachers stressed writing and reading. Science was the least emphasized subject.

As a result of their experiences in the vocational education program at Jonesboro, most students felt confident about their readiness to meet the demands of the work world (Table 3).

Table 3: Perceived Outcomes of Educational Program

School: Jonesboro Area Vocational High School		
I feel confident that my high school education has adequately prepared me to:	Percent	
	<u>Agree</u>	<u>Disagree</u>
Search and obtain appropriate employment.	88.7	11.3
Perform the skills necessary at the entry level in my chosen profession.	90.8	9.2
Read, understand, and apply technical information on the job.	92.7	7.3
Be a responsible person at work, at home, and in the community.	91.3	8.7

About 90 percent reported that they felt ready to seek and obtain employment; perform necessary skills; and read, understand, and apply technical information on the job. Most also felt prepared to be a responsible person at work, in the home, and in the community.

The three most common plans upon leaving high school were working full-time, attending a four-year college full-time or part-time, or taking vocational or technical courses at a trade or business school (Table 4).

Table 4: Future Plans

School: Jonesboro Area Vocational High School	
What is the one thing that is likely to take the largest share of your time in the year after you leave high school?	
	Percent
Working full-time	41.8
Entering an apprenticeship or on-the-job training program	1.4
Going into regular military service (or service academy)	10.3
Being a full-time homemaker	2.1
Taking vocational or technical courses at a trade or business school full-time or part-time	17.8
Taking academic courses at a junior or community college full-time or part-time	3.4
Taking technical or vocational courses at a junior or community college full-time or part-time	0.7
Attending a four-year college full-time or part-time	20.5
Working part-time, but not attending school or college	0.7
Other (travel, take a break, no plans)	1.4

READING RESULTS

On a scale of overall reading proficiency, vocational education students at Jonesboro scored at the national average, and below the national average proficiency levels of students in academic programs. However, they scored slightly higher in reading proficiency than students in vocational education programs in the NAEP sample (Table 5).

Table 5: Overall Reading Proficiency

School: Jonesboro Area Vocational High School	
	Proficiency*
Site	54.7(0.3)
Nation (Vocational Ed.)	50.4(0.3)
Nation (Academic)	59.1(0.2)
Nation (Total)	54.9(0.2)

At Jonesboro, and in the nation as a whole, females tended to score higher than males in reading (Table 6).

Table 6: Reading Proficiency by Gender

School: Jonesboro Area Vocational High School	
	Proficiency*
Site	
Male	53.1(0.4)
Female	57.1(0.2)
Nation	
Male	53.3(0.3)
Female	56.6(0.2)

Moreover, both males and females at Jonesboro scored, on the average, about the same as their peers across the nation.

Table 7 shows that at Jonesboro, and at the national level, White students had higher levels of proficiency in reading than did Black students.

Table 7: Reading Proficiency by Race/Ethnicity

School: Jonesboro Area Vocational High School	
	Proficiency*
Site	
Black	49.1(1.0)
White	55.1(0.3)
Nation	
Black	50.1(0.3)
White	56.4(0.2)

Reading proficiency varied somewhat by program (Table 8).

Table 8: Reading Proficiency by Program

School: Jonesboro Area Vocational High School	
	Proficiency*
Agricultural	50.5(0.8)
Business/Office	53.5(1.0)
Consumer/Homemaking Ed.	55.6(0.8)
Health Occupations	60.6(0.8)
Home Economics Occupations	47.9(2.1)
Marketing	54.8(1.5)
Technical	56.4(0.7)
Tech.Ed./Industrial Arts	55.5(0.5)
Trade/Industrial Occupations	53.8(0.5)

Students in health occupations had relatively high reading proficiencies. At the low end of the distribution were students in the home economics occupations program.

*Jackknifed standard errors are presented in parentheses.

Most students were taking an English course at the time of the assessment (Table 9). Of those enrolled in English, most were taking a general-level course. Smaller numbers were enrolled in remedial, advanced placement, or honors English.

Table 9: Reading Proficiency by Current English Class

School: Jonesboro Area Vocational High School		
	Percent	Proficiency*
I am not taking English	2.0	47.6(2.6)
Remedial	7.9	50.0(0.6)
General	78.3	55.1(0.3)
College Preparatory	8.6	57.9(0.4)
Advanced Placement or Honors	3.3	52.6(1.6)

MATHEMATICS RESULTS

At Jonesboro performance in mathematics was below the overall national average, but greater than that of vocational education students in the NAEP sample (Table 10).

Table 10: Overall Mathematics Proficiency

School: Jonesboro Area Vocational High School		Proficiency*
Site		
Nation (Vocational Ed.)		293.4(0.5)
Nation (Academic)		282.3(1.1)
National (Total)		317.7(0.7)
		300.7(0.7)

Table 11 shows that at Jonesboro females outperformed males in mathematics, but in the national sample, males scored higher than females.

Table 11: Mathematics Proficiency by Gender

School: Jonesboro Area Vocational High School		Proficiency*
Site		
Male		292.6(0.7)
Female		294.5(0.4)
Nation		
Male		301.7(1.0)
Female		299.6(0.6)

At Jonesboro, and in the national sample, White students had higher proficiency scores in mathematics than did Black students (Table 12).

Table 12: Mathematics Proficiency by Race/Ethnicity

School: Jonesboro Area Vocational High School		Proficiency*
Site		
Black		269.1(2.3)
White		294.4(0.5)
Nation		
Black		274.9(1.0)
White		306.9(0.7)

At Jonesboro, however, the gap between Black and White students was much smaller than it was in the national sample. Black students at Jonesboro had lower proficiency scores than did Black students in the national sample; White students at Jonesboro had lower proficiency scores than did White students nationally.

Students in various programs differed considerably in average mathematics proficiency (Table 13).

Table 13: Mathematics Proficiency by Program

School: Jonesboro Area Vocational High School		Proficiency*
Agricultural		268.9(2.8)
Business/Office		285.5(2.1)
Consumer/Homemaking Ed.		283.7(4.9)
Health Occupations		304.7(1.5)
Home Economics Occupations		266.0(4.1)
Marketing		296.4(2.8)
Technical		304.9(1.4)
Tech. Ed./Industrial Arts		303.6(1.6)
Trade/Industrial Occupations		292.1(0.7)

At the high end of the mathematics distribution were students in technical education/industrial arts, technical programs, and health occupations. At the low end were agricultural students.

Table 14 shows the percentages of the Jonesboro vocational education students who have taken various mathematics courses and the proficiencies of those students by coursework.

*Jackknifed standard errors are presented in parentheses.

Table 14: Mathematics Proficiency by Mathematics Coursework*

School: Jonesboro Area Vocational High School		
	<u>Have Taken</u>	<u>Have Not Taken</u>
General Business, or Consumer Math		
Percent	77.2	22.8
Proficiency	292.3(0.6)	295.8(1.8)
Pre-Algebra or Introduction to Algebra		
Percent	55.9	44.1
Proficiency	298.7(0.9)	286.3(0.7)
First-Year Algebra		
Percent	72.4	27.6
Proficiency	301.4(0.9)	271.2(1.0)
Second-Year Algebra		
Percent	31.0	69.0
Proficiency	310.0(1.0)	285.4(0.5)
Trigonometry		
Percent	7.9	92.1
Proficiency	324.7(3.7)	290.8(0.4)
Pre-Calculus or Calculus		
Percent	1.4	98.6
Proficiency	326.3(4.8)	293.0(0.4)

It is worth noting that most students who took higher-level courses had probably taken some of the lower-level courses as well. Hence, both the percentages and proficiency scores were often factored into more than one category. Most students have taken general mathematics or first-year algebra, while only about 31 percent have taken second-year algebra. Still fewer, around 8 percent, had taken trigonometry. As expected, mathematics proficiency scores rise with more advanced levels of coursework.

SCIENCE RESULTS

Average science proficiencies of vocational education students at Jonesboro are lower than in the nation as a whole and higher than the vocational education portion of the national sample (Table 15).

Table 15: Overall Science Proficiency

School: Jonesboro Area Vocational High School	
	<u>Proficiency*</u>
Site	276.8(1.4)
Nation (Vocational Ed.)	266.7(1.7)
Nation (Academic)	308.1(0.8)
Nation (Total)	287.1(0.8)

Both males and females at Jonesboro fell below the national means in science proficiency. However, females showed higher proficiencies than males at Jonesboro. The reverse is the case at the national level (Table 16).

Table 16: Overall Science by Gender

School: Jonesboro Area Vocational High School		<u>Proficiency*</u>
Site		
Male		274.8(2.0)
Female		279.6(1.5)
Nation		
Male		293.3(1.0)
Female		280.8(0.9)

At Jonesboro, White students had higher science proficiency levels than did Black students, also following the pattern at the national level (Table 17).

Table 17: Science Proficiency by Race/Ethnicity

School: Jonesboro Area Vocational High School		<u>Proficiency*</u>
Site		
Black		235.3(5.7)
White		279.9(1.5)
Nation		
Black		248.1(1.4)
White		297.3(0.8)

But the gap was less at Jonesboro: there was a significant difference in science proficiency between Black students at Jonesboro and Black students across the country. White students at Jonesboro, however, scored considerably lower than White students in the national sample.

There was considerable variation among programs in average science proficiency (Table 18).

Table 18: Science Proficiency by Program

School: Jonesboro Area Vocational High School		<u>Proficiency*</u>
Agricultural		267.7(4.8)
Business/Office		261.8(6.0)
Consumer/Homemaking Ed.		272.9(13.7)
Health Occupations		281.9(4.0)
Home Economics Occupations		241.3(11.4)
Marketing		280.2(6.3)
Technical		297.0(3.8)
Tech.Ed./Industrial Arts		293.4(3.8)
Trade/Industrial Occupations		272.5(1.6)

*Jackknifed standard errors are presented in parentheses.

Students in the technical program had the highest proficiency level; at the lower end were students in home economics occupations.

Table 19 shows the range of science courses taken by Jonesboro students and the associated science proficiencies. Over 90 percent had taken general science and biology. Significantly fewer had taken chemistry (10.7 percent) or physics (7.9 percent). The lowest average science proficiencies were associated with students who had taken physics, but this low value may be limited in meaning because of the small proportion of students who had taken physics. The highest science proficiency levels were associated with students who had taken chemistry. Students who had taken only general science had lower science proficiencies.

Table 19: Science Proficiency by Science Coursework*

School: Jonesboro Area Vocational High School		
	<u>Have Taken</u>	<u>Have Not Taken</u>
General Science		
Percent	89.5	10.5
Proficiency	277.0(0.9)	275.7(5.0)
Biology		
Percent	92.4	7.6
Proficiency	277.8(1.9)	268.9(7.5)
Chemistry		
Percent	10.7	89.3
Proficiency	306.6(7.0)	273.8(0.6)
Physics		
Percent	7.9	92.1
Proficiency	304.6(3.6)	274.6(1.1)

*Jackknifed standard errors are presented in parentheses.

DESIGN AND DEVELOPMENT OF THE BASELINE ASSESSMENT

The goal of the assessment component of the Consortium project is to measure the improvement in what has been called the basic competencies of students (called "completers") who have finished at least four Carnegie units in one vocational concentration. The rationale that motivated the baseline assessment in 1988 was to identify a benchmark of student performance for each participating site before the experimental changes in program activities were introduced by the project.

In January of 1988, representatives of the participating states in the SREB Consortium met to review the objectives and questions used in the National Assessment of Educational Progress (NAEP) for possible inclusion in the baseline assessment. Uppermost in the minds of the participants was that the resulting assessment should be a fair representation of the basic competencies--not the basic skills--of students completing their course work in high school. As a result, care was taken to be certain that the blocks of questions selected for the assessment covered the full range of content and difficulty that could reasonably be expected of students graduating from high school. All items were examined to assure they were fair and sensitive to the perceptions of students with varying ethnic, racial, and cultural backgrounds. The selection of questions in each subject was also made to assure comparability with NAEP data and to assure that the number of questions in each subject area was sufficiently large to facilitate a detailed analysis of the results for purposes of curriculum review by local teachers and administrators.

A subsequent meeting of Consortium members approved questions on student background and school and course experience to serve as a context for understanding achievement results. These questions formed a student survey that included NAEP questions but also contained questions that focused on the vocational education experience. These questions are found in the Appendix of this report.

The assessments for reading, mathematics, and science were separately timed. Each required 48 minutes to complete, exclusive of the student survey. The assessments were conducted at the respective sites by school or state personnel. The data were analyzed and reported by Educational Testing Service in association with SREB.

DESCRIPTION OF THE OBJECTIVES AND CONTENT OF THE ASSESSMENT

As mentioned, the assessment for the SREB Consortium project was composed of reading, mathematics, and science items developed by the National Assessment of Educational Progress (NAEP) and administered to a national sample of students. The NAEP questions for each subject area were developed by separate committees of teachers and curriculum specialists throughout the United States. Prior to developing the NAEP assessment, these committees met to focus on the educational objectives (degree of emphasis to be given to various content categories and process skills) that would provide a framework for the assessment in their respective subject areas. These objectives were reviewed by representatives of the SREB Consortium and form the foundation of the Vocational Education Assessment conducted in the spring of 1988. What follows is a brief presentation of the objectives in each subject area. A more complete description of the NAEP objectives may be found in the objectives booklet for each subject, available through the NAEP office.

READING OBJECTIVES

These objectives, based largely on the NAEP objectives, are best described in terms of the behavioral activities required of the student.

1. Deriving Information and Ideas

The reader identifies, locates, selects, or confirms information for a specific purpose. The student is required to find a particular fact, idea, or other piece of information in the midst of a variety of reading materials. The student must read carefully for comprehension and also skim to find information.

2. Integrating Information and Ideas

The reader generalizes information and relates it to a new situation or infers a cause or consequence of a particular action or behavior. The reader might note assumptions underlying statements, see patterns in information or ideas, develop examples that match a rule or generalization, or discover a general principle after reading several examples. Individual strategies may differ, but the reader must go beyond what is found in the text to create a new

understanding or personal application.

3. Evaluating and Reacting

The reader analyzes a work to determine the adequacy of evidence to support a position, state personal preferences, or characterize a particular type of writing. Many concepts, such as "author's voice" and "mood," are learned in formal English classes. Although some readers have not acquired an understanding of these sophisticated concepts, they have been exposed to a variety of reading materials. They do have opinions about what they read.

The vocational education students were asked to read up to nine different reading prompts and answer 36 questions based on what they had read. Fifty-three percent of the reading assessment focused on deriving information (Objective One), 39% was based on integrating information (Objective Two), and the remaining 8% required students to evaluate what they had read (Objective Three).

CLASSIFICATION OF READING QUESTIONS

The number of reading items for the Consortium Project classified by the behavioral activities required is presented below.

Process Classification	Number of Items
Deriving Information and Ideas	19
Integrating Information and Ideas	14
Evaluating and Reacting	3
Total Number of Reading Items	36

MATHEMATICS OBJECTIVES

The mathematics items in the SREB assessment have been classified by content as well as by process areas (or competencies). Both classifications are useful and necessary in the review of results for identifying new directions or next steps toward improving performance. There are seven content categories that were used to classify the mathematics items and five process classifications. Both are described briefly below.

Process Area: Problem Solving Questions are intended to assess higher-order thinking skills. These questions require such processes as identifying and using a problem-solving strategy, separating relevant from irrelevant information, formulating a problem, and identifying all information needed to solve a problem.

Process Area: Routine Application Questions use mathematical knowledge, skill, and understanding in solving problems that would ordinarily be found in a textbook assignment. The selection of the appropriate procedure to apply would be either given or obvious.

Process Area: Understanding/Comprehension Questions involve the interpretation and elaboration of underlying concepts, assumptions, relationships, and the like. These questions may require the student to identify an example of a concept, to recognize when a particular technique may be helpful, or to give additional information needed to solve a routine problem.

Process Area: Skill Questions involve straightforward, routine manipulation of numbers and rely on standard procedures that lead directly to answers. For example, these questions might require the student to make measurements, multiply two fractions, perform mental computations, or read a table.

Process Area: Knowledge Questions involve both recall and recognition of mathematical content as expressed in words, symbols, or figures. These questions may require that a student recall a mathematical fact such as the product of five and two, or recall the symbol that means "parallel."

Students were asked to respond to 87 questions in mathematics. Five percent of those questions were problem-solving questions, 14% were routine application questions, 32% were understanding or comprehension questions, and 44% were skill questions and 5% called for knowledge of mathematics.

CONTENT AREAS

Mathematical Methods: Questions assess an understanding of the tools of mathematics and processes that are central to the extension, development and use of mathematics.

Discrete Mathematics: Questions concern probability, permutations, and combinations, the application of sums and products of matrices, and solutions to matrix equations.

Data Organization and Interpretation: Questions assess organizing, analyzing, and interpreting data, including determining measurement of central tendency and of spread.

Measurement: Questions concern the concepts of measurement, equivalent measurements, the selection and application of appropriate size and type of units, instrument reading, and precision and accuracy.

Questions may include measurements related to temperature, area, volume, scale drawings, and money.

Geometry: Questions assess properties and relations of geometric figures such as parallel lines, similar polygons, congruent figures, vertical angles, and angles of a triangle. Also assessed are lines of symmetry, images of figures or designs under flips, turns, and slides, and other spatial relations in two and three dimensions.

Relations and Functions: Questions assess the use of variables in expressions of relationships; translations from words to symbols; and use of variables to represent properties of operations, number theory concepts, and properties of equality and inequality as expressed by equations or systems of equations.

Numbers and Operations: Questions requiring mental computation are assessed, as is estimation of computation. Number properties and relationships such as number patterns, ratios, and proportion are assessed.

Classification of Mathematics Questions

The mathematics questions used in the SREB Consortium project are classified by content category and by process area below:

Process	Content Categories* (Number of Items)							Total
	1	2	3	4	5	6	7	
Problem Solving/ Reasoning	2		1	1				4
Routine Application		1	3	3			5	12
Understanding/ Comprehension	1	4	1	2	10	3	7	28
Skill			3	4	1	7	26	41
Knowledge	—	—	—	1	2	—	2	5
Total	3	5	8	11	13	10	40	90

*Key to Content Categories:

- | | |
|---|---|
| 1. Mathematical Methods | 5. Geometry |
| 2. Discrete Mathematics | 6. Relations and Functions |
| 3. Data Organization and Interpretation | 7. Numbers and Operations (Computation) |
| 4. Measurement | |

SCIENCE OBJECTIVES

The science items have been classified by content category and by the cognitive processes required to deal with the science content. The NAEP committee that developed the science assessment defined three generic categories--knows, uses, and integrates--based on the following descriptions.

Process Area: Knows These questions primarily test factual knowledge. Successful performance depends on the ability to recall specific facts, concepts, principles, and methods of science; to show familiarity with scientific terminology; to recognize these basic ideas in a different context; and to translate information into other words or another format.

Process Area: Uses These questions test the ability to combine factual knowledge with rules, formulas, and algorithms for a specified purpose. Successful performance depends on the ability to apply basic scientific facts and principles to concrete and/or unfamiliar situations; to interpret information or data using the basic ideas of the natural sciences; and to recognize relationships of concepts, facts, and principles to observed data.

Process Area: Integrates These questions test the ability to organize the component processes of problem solving and learning for the attainment of more complex goals. Successful performance depends on the ability to analyze a problem, to organize a series of logical steps, to draw conclusions on the basis of available data, and to employ other higher-order skills needed for reaching the solution to a problem.

CLASSIFICATION OF SCIENCE QUESTIONS

The content dimension of the science objectives includes both the body of knowledge in the traditional disciplines of science and knowledge about science, its nature and processes, and its history. The content dimension contains six major categories: life sciences, physics, chemistry, earth and space sciences, history of science, and nature of science. The science questions used in the SREB Consortium project are classified by content category and by process area below.

	Content Categories (Number of Items)						Total
	Life Sciences	Phys- ics	Chem- istry	Earth & Space Science	History of Science	Nature of Science	
Knows	10	1	0	9	0	8	28
Uses	10	2	6	0	0	6	24
Integrates	4	3	2	1	2	0	12
Total	24	6	8	10	2	14	64

THE STUDENT SURVEY

One of the differences between the SREB Consortium baseline assessment and a test is that the assessment permits the performance of groups of students to be analyzed from several perspectives that may or may not be directly related to performance. The power of the assessment and its utility in considering possible curricular or policy changes comes from looking at student performance in the context of student survey data. Students who participated in the Consortium assessment answered 224 questions. These questions, found in the Appendix, are classified in the following ways:

Student Background These questions seek demographic and home-environment information, including questions about race or ethnicity, language spoken in the home, parents' educational level, hours the student spends watching television, doing homework, working part-time, and the availability and use of computers. There are 39 questions in this category.

Vocational Education Experience These questions, created by the SREB Vocational Education Consortium members, seek information about the students' perceptions of and experience in vocational programs. Questions about the program concentration, specific course experience, reactions to teachers, counselor assistance and involvement, and general satisfaction with the high-school program. There are 73 questions in this category.

Attitudes and Perceptions Related to Subject Areas Assessed These questions relate to instruction, schooling, study habits, and experiences directly related to reading, mathematics, and science. For example, these questions pertain to the course work students have taken in the subject, the instructional approaches used by their teachers, the value students place on the utility or importance of the subject in their lives, and the relative confidence in performance the students may have in a particular subject. There are 112 questions in this category. The Compendium of Performance Data, the companion document of this report, contains information on the percent of students responding to each background question as well as group performance. For example, a quick review of the compendium containing the item analysis will show not only the percent of students watching various amounts of television each day but also the statistical relationship between the amount of television viewing and student performance in each subject. A more detailed explanation of how to use the Compendium of Performance Data appears in a separate section of this report.

JONESBORO AVTHS

PILOT SITE REPORT

ASSESSMENT OF READING, MATHEMATICS, AND SCIENCE

**SOUTHERN REGIONAL EDUCATION BOARD
VOCATIONAL EDUCATION CONSORTIUM PROJECT**

SPRING 1990

PREPARED BY



**EDUCATIONAL TESTING SERVICE
PRINCETON, NEW JERSEY**

PREFACE

The Southern Regional Education Board (SREB) Vocational Education Consortium conducted its second assessment in reading, mathematics, and science in the spring of 1990. The first assessment was conducted in 1988 to collect baseline information about students who were completing their vocational education. The 1990 assessment, as was the case in 1988, contained questions previously administered to a national sample of students by the National Assessment of Educational Progress (NAEP). The information was collected for comparison with national data and with progress subsequent students would make in achieving the Consortium goal of closing by one-third the gap in achievement -- as measured by NAEP in 1993 -- between 1988 SREB vocational education completers and the 1986 NAEP national sample of 17-year-old students who were enrolled in an academic curriculum. The Consortium plans to achieve this goal as a result of program and structural changes introduced at pilot sites.

The 1990 assessment also contained a comprehensive survey of students' background, school experiences, and personal interests and plans. Nearly all the questions in the survey are repeated from the first assessment and are helpful in gaining an understanding of student perceptions of school initiatives as well as their own interests and plans. This document provides a context for studying the results of student performance at your site. A detailed compendium of student responses is available to most sites. An archival data tape containing the output for each participating site in the Consortium project is on file at the SREB office in Atlanta, Georgia.

Questions related to this report or the performance data may be directed to Douglas Rhodes, The Center for Assessment, Educational Testing Service, Princeton, New Jersey 08541, or telephone toll-free (800) 223-0267. Questions about the SREB Vocational Education Consortium Project may be directed to your state vocational education coordinator or to Gene Bottoms, SREB (404) 875-9211.

HIGHLIGHTS OF MAJOR FINDINGS

SREB

SREB-STATE VOCATIONAL EDUCATION CONSORTIUM
STUDENT ASSESSMENT RESULTS

1990

The following are highlights from the results of the 1990 SREB Vocational Consortium assessment of vocational completers at Jonesboro. In the spring of 1990, approximately 3,600 seniors identified as vocational completers from 38 pilot sites in 15 states were assessed in the subjects of reading, mathematics, and science using a portion of the National Assessment of Educational Progress (NAEP). This 1990 assessment follows a baseline assessment -- conducted in the spring of 1988 -- of almost 3,100 vocational completers from 34 SREB pilot sites in 13 states. The baseline information was collected for comparison with national data and with progress students might make in 1990 and 1993 as the result of program or structural changes introduced at the pilot sites. Any references to national comparisons reflect the achievement scores of 17-year-old public high school students from a national sample of students assessed with NAEP in the spring of 1986.

- The overall reading, mathematics, and science achievement scores of 1990 Jonesboro students were higher than those of Jonesboro students in 1988. As a result of these improvements, Jonesboro completers met or moved beyond the SREB Consortium Goals for each of the three subject areas (Tables 1, 6, and 13).
- In 1990, with the exception of reading scores for White students, both Black and White students at Jonesboro posted significant increases when compared to 1988 results for each of the three subject areas. In stark contrast to national data, the performance of Black students at Jonesboro in all three subject areas was at or above that of White students (Tables 2, 7, and 14).
- By far, the largest percentage of vocational completers at Jonesboro were enrolled in technical programs. Students with the highest reading achievement scores were enrolled in business and office programs; for mathematics, the highest scores were posted by students in marketing programs; and for science, the highest scores were achieved by students in marketing, trade and industrial, and technical programs (Tables 3, 8, and 15).
- In the subject of mathematics, almost 85 percent of the 1990 Jonesboro vocational completers had taken first-year algebra, about 62 percent had taken geometry, and about 44 percent had completed a second-year algebra course; enrollment in these three courses increased significantly from 1988 levels. In none of the specified mathematics courses did achievement scores improve when comparing 1988 to 1990. For science, almost 100 percent of the 1990 Jonesboro vocational completers indicated that they had taken biology, yet fewer than 20 percent had taken chemistry and less than 5 percent reported completing physics. Jonesboro students completing general science and biology posted higher scores when compared to 1988 data (Tables 12 and 19).
- A little more than one-third of the Jonesboro students reported that teachers often stressed the importance of reading, which was significantly below the SREB Consortium average; responses for mathematics and science were well above the SREB averages (Table 21).
- Very little progress was made from 1988 in the percentage of 1990 Jonesboro completers who reported that they usually did not have any homework assigned (a decrease of 2 percent, from 46 percent in 1988 to 44 percent in 1990). Less than one-third of Jonesboro students reported spending about one hour on homework each day (Table 24).

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INTERPRETING THE RESULTS

A Brief Word About Interpretations

Interpreting the assessment results--attempting to put them in the "real-world" context, advancing plausible explanations of effects, and suggesting possible courses of action--will always be an art, not a science. No one can control all the possible variables affecting a survey. Also, any particular finding may be explained in many ways or perhaps not at all. Further, the findings presented here offer comparisons between student performance and other variables such as course enrollment, student attitudes, and laboratory or computer experiences. These relationships are statistical relationships only and should not be mistaken for cause-and-effect statements. Nevertheless, these relationships do provide insights into the importance of various indicators to performance. In order to bring meaning to these data, teachers and administrators who understand local conditions and possibilities need to apply their professional judgment and experience to these findings. Only in these contexts can comparisons or interpretations stand the test of reason.

Limits of Interpretation

The reading, mathematics, and science achievement results presented for SREB site vocational completers should not be interpreted as being representative of all vocational completers in the entire SREB region. In selecting the pilot sites to participate in the Consortium, no attempt was made to identify a representative sample of high schools or students for the region. Rather, pilot sites were selected on a competitive basis because school officials demonstrated a willingness to pursue initiatives for improving the high school experiences of students taking vocational courses.

Because the data presented for the pilot site and the SREB Consortium in this report are based on a relatively small number of students, caution should be exercised in interpreting the results. These figures are subject to variation and, in many cases, calculated differences between groups of students can be attributed to the small number of students in a group rather than to actual statistical differences between the groups.

Differences in the scores between the 1988 and 1990 assessments may be attributable to one or more of the following:

- Significant changes or shifts in the student body may have occurred which relate to race or gender, or as the result of redistricting or restructuring.
- Students in 1988 were assessed in late April/early May; in 1990, they were assessed in early April. As a result, students in 1988 had completed a month more schoolwork than those assessed in 1990.
- The 1988 assessment may have contained data for students who were not vocational completers, as defined by the Consortium, because pilot sites were being identified almost at the same time the assessment was being administered and the sites were not yet familiar with the Consortium definition for vocational completers.

The challenge is to look at the scores and distinguish between the differences of the two assessments with regard to the above-mentioned and other possible factors.

No Comparisons Across Subject Areas

Each of the assessments in reading, mathematics, and science has been placed on a separate scale, based on test development and scaling activities. The achievement data were analyzed using Item Response Theory (IRT) scaling technology and are reported as scale scores -- 0-100 for reading; 0-500 for mathematics and science. These scales **are not** comparable across subject areas; i.e., the level of skills needed to achieve a scale score of 275 on the mathematics assessment is not comparable to the level of skills needed to score 275 on the science assessment. Similarly, the percentage of students correctly answering questions in one content or process area cannot be confidently compared with the performance in another area due to variations in the relative difficulty of questions in each of the categories. The IRT analysis provides a common scale on which performance within a subject can be compared across groups such as gender, vocational program, or race/ethnicity, whether the students were assessed at the same time or a number of years apart. These scales also make it possible to examine relationships between student performance and a variety of background factors. Descriptions of what students can do and cannot do at various points along these scales can be found in the Appendix.

Descriptions of Comparison Groups

For the purposes of this report, **national data represent only the scores of 17-year-old public high school students in the NAEP sample.** Scores are presented for the following groups of students:

- SITE -- Those seniors identified by pilot site staff as having completed at least four Carnegie units in a vocational concentration and who were tested with questions from the National Assessment of Educational Progress.
- SREB 1990-- Those seniors (approximately 3,600 in number) at 38 pilot sites in 15 states participating in the SREB-State Vocational Education Consortium identified by pilot site staff as having completed at least four Carnegie units in a vocational concentration and who were tested with questions from the National Assessment of Educational Progress in the spring of 1990.
- NATION/TOT -- All 17-year-old public high school students in the 1986 NAEP national sample.
- NATION/ACAD -- Those 17-year-old public high school students in the 1986 NAEP national sample indicating that they were enrolled in the college preparatory curriculum.
- NATION/VOCED -- Those 17-year-old public high school students in the 1986 NAEP national sample indicating that they were enrolled in the vocational curriculum.

READING PROFICIENCY

Overview of Results

On a scale of overall reading proficiency, vocational education students at Jonesboro scored 0.8 points higher than their mean performance in 1988, meeting the SREB Consortium Goal of 55.5 for reading proficiency. Although the students remained below the national average of students in academic programs, they exceeded the achievement level of all students in the 1986 NAEP national sample (Table 1).

TABLE 1

READING SCORES

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS	1990
		MEAN SCORE	
SITE 1990		55.5(0.3)	
SREB 1990		52.7(0.1)	
SITE 1988		54.7(0.3)	
NAT/TOTAL		54.9(0.2)	
NAT/ACAD		59.1(0.2)	
NAT/VOCED		50.4(0.3)	
SREB GOAL		55.5	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 2 shows that in 1990 both male and female students at Jonesboro improved their reading scores when compared to Jonesboro students in 1988; the proficiency of male students increased by 1.3 points, while the scores for female students rose by 2.5 points. Consistent with national data, female students at Jonesboro achieved a higher level of reading proficiency than did male students.

The same table indicates that the reading scores of Black students at Jonesboro increased dramatically -- by 11.3 points -- when compared to their performance in 1988; the achievement of White students remained virtually the same. Unlike national data, the performance of Black students at Jonesboro exceeded that of White students.

TABLE 2
READING SCORES
BY GENDER AND RACE/ETHNICITY

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
<u>MEAN SCORES</u>					
	<u>MALE</u>	<u>FEMALE</u>	<u>BLACK</u>	<u>WHITE</u>	
SITE 1990	54.4(0.8)	59.6(1.2)	60.4(1.2)	55.2(0.3)	
SREB 1990	50.8(0.1)	54.7(0.1)	49.5(0.2)	54.1(0.1)	
SITE 1988	53.1(0.4)	57.1(0.2)	49.1(1.0)	55.1(0.3)	
NAT/TOTAL	53.3(0.3)	56.6(0.2)	50.1(0.3)	56.4(0.2)	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 3 shows that at Jonesboro, by far the largest percentage of students are enrolled in technical programs (43.9 percent). Students enrolled in business and office programs posted the highest reading achievement scores, exceeding the SREB Consortium Goal of 55.5 for reading proficiency. (Due to the high standard error, the score for health should be interpreted with caution.)

TABLE 3
READING SCORES AND
PERCENTAGE ENROLLED BY VOCATIONAL PROGRAM

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS		1990	
	SITE 1990		SREB 1990		
	PERCENT	SCORE	PERCENT	SCORE	
AGRICULTURE	4.5	48.4(1.1)	6.5	51.6(0.2)	
BUSINESS AND OFFICE	12.1	61.5(1.9)	27.2	55.7(0.1)	
HEALTH	3.0	57.0(3.1)	6.9	53.3(0.2)	
HOME ECONOMICS	4.5	52.8(1.4)	8.0	50.8(0.2)	
MARKETING	6.1	56.7(1.2)	8.6	53.6(0.2)	
TECHNICAL	43.9	54.4(0.3)	17.9	52.6(0.1)	
TRADE AND INDUSTRIAL	25.8	56.0(1.6)	20.8	50.5(0.1)	
SREB GOAL				55.5	

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Levels of Reading Proficiency

The NAEP-defined Levels of Proficiency, described in the Appendix, provide a helpful way to understand how students at Jonesboro distribute themselves along the reading scale. The five Levels of Proficiency add real meaning to the scores by helping to convey what students at each level are actually able to do.

Table 4 shows how students at Jonesboro performed at each of the five levels of reading proficiency. At the basic, intermediate, and adept levels, Jonesboro completers exceeded the performance of all the comparison groups except college preparatory students in the NAEP national sample. At the advanced level, the performance of Jonesboro students lagged behind each of the comparison groups except for students in the NAEP national sample who indicated they were enrolled in the vocational curriculum.

TABLE 4
PERCENTAGE PERFORMING AT OR ABOVE
EACH READING LEVEL OF PROFICIENCY

	SREB	SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS				1990
	RUDIMENTARY (30)	BASIC (40)	INTERMEDIATE (50)	ADEPT (60)	ADVANCED (70)	
SITE 1990	100.0	96.9	78.5	32.3	1.5	
SREB 1990	98.6	91.6	63.4	20.3	2.7	
NAT/TOT	99.6	92.5	69.0	31.8	6.0	
NAT/ACAD	99.9	97.0	84.7	48.9	10.8	
NAT/VOC	98.9	85.3	52.7	14.6	0.9	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score — referred to as the confidence interval — allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Performance by Process Areas

Another way of interpreting performance beyond examining what students can do at various levels along the reading scale is to review their reading performance by process skills -- what thought processes students should go through to correctly answer questions. (These skills are described in greater detail in the Appendix.) This can be especially helpful in determining the emphasis teachers may choose to place on various aspects of reading.

Table 5 shows that compared to each of the groups except national academic students, Jonesboro students were able to correctly answer a higher percentage of questions in all three content areas. Jonesboro students answered correctly at least two-thirds of the questions in each category.

TABLE 5
PERCENTAGE INDICATING CORRECT RESPONSES
BY READING PROCESS AREAS

SREB	SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS					1990
	SITE 1990	SREB 1990	NAT/TOI	NAT/ACAD	NAT/VOC	
DERIVING INFORMATION	74.9	67.3	69.0	77.7	60.1	
INTEGRATING AND APPLYING INFO.	75.8	70.4	73.4	80.9	64.9	
EVALUATING AND REACTING	68.8	64.2	66.5	75.3	56.1	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

MATHEMATICS PROFICIENCY

Overview of Results

Jonesboro vocational education students increased their mathematics proficiency by 5.9 points, a significant improvement since 1988. As Table 6 indicates, although Jonesboro students fell short of the national NAEP mean for academic students, they moved beyond the SREB Consortium Goal of 301.0 for mathematics proficiency.

TABLE 6

MATHEMATICS SCORES

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS	1990
		MEAN SCORE	
SITE 1990		299.3(1.6)	
SREB 1990		290.3(0.2)	
SITE 1988		293.4(0.5)	
NAT/TOTAL		300.7(0.7)	
NAT/ACAD		317.7(0.7)	
NAT/VOCED		282.3(1.1)	
SREB GOAL		301.0	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 7 shows that in 1990 both male and female students at Jonesboro improved on their mathematics scores from 1988; the proficiency of male students increased by 6.7 points, while the scores for female students gained 3.7 points. Unlike national data, female students at Jonesboro achieved at the same level in mathematics as male students.

The same table indicates that in 1990 both Black and White students at Jonesboro scored higher in mathematics than they did in 1988; the scores of Black students showed a dramatic increase of 36.1 points, while the achievement of White students rose by 4.5 points. In stark contrast to national data, Black students at Jonesboro outperformed White students in mathematics.

TABLE 7
MATHEMATICS SCORES
BY GENDER AND RACE/ETHNICITY

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
<u>MEAN SCORE</u>					
	<u>MALE</u>	<u>FEMALE</u>	<u>BLACK</u>	<u>WHITE</u>	
SITE 1990	299.3(1.4)	298.2(2.4)	305.2(2.2)	298.9(1.7)	
SREB 1990	291.5(0.2)	289.3(0.2)	280.3(0.6)	293.5(0.3)	
SITE 1988	292.6(0.7)	294.5(0.4)	269.1(2.3)	294.4(0.5)	
NAT/TOTAL	301.7(1.0)	299.6(0.6)	274.9(1.0)	306.9(0.7)	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 8 shows that at Jonesboro, by far the largest percentage of students are enrolled in technical programs (43.9 percent). Students enrolled in marketing programs posted the highest mathematics achievement scores, exceeding the SREB Consortium Goal of 301.0 for mathematics proficiency. In addition, students in business and office programs scored higher than the SREB Consortium average for the same programs. (Due to the high standard error, the score for home economics should be interpreted with caution.)

TABLE 8

**MATHEMATICS SCORES AND
PERCENTAGE ENROLLED BY VOCATIONAL PROGRAM**

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS		1990	
	SITE 1990		SREB 1990		
	PERCENT	SCORE	PERCENT	SCORE	
AGRICULTURE	4.5	278.6(3.3)	6.5	286.1(1.1)	
BUSINESS AND OFFICE	12.1	304.9(3.9)	27.2	293.7(0.4)	
HEALTH	3.0	280.1(3.6)	6.9	284.9(0.3)	
HOME ECONOMICS	4.5	291.5(6.8)	8.0	279.1(0.7)	
MARKETING	6.1	315.5(2.2)	8.6	293.2(0.7)	
TECHNICAL	43.9	299.8(2.6)	17.9	295.9(0.3)	
TRADE AND INDUSTRIAL	25.8	299.4(1.2)	20.8	288.2(0.5)	
SREB GOAL				301.0	

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Levels of Mathematics Proficiency

The NAEP-defined Levels of Proficiency, described in the Appendix, provide a helpful way to understand how students at Jonesboro distribute themselves along the mathematics scale. The five Levels of Proficiency add real meaning to the scores by helping to convey what students at each level are actually able to do.

Table 9 shows how students at Jonesboro performed at each of the five levels of mathematics proficiency. At the third and fourth levels -- which require students to successfully complete basic operations and beginning problem solving moderately complex procedures and reasoning -- Jonesboro completers exceeded the performance of all the comparison groups except college preparatory students in the NAEP national sample. None of the Jonesboro students were able to perform at the highest level of proficiency, where students must demonstrate mastery of multi-step problem solving and algebra.

TABLE 9
PERCENTAGE PERFORMING AT OR ABOVE
EACH MATHEMATICS LEVEL OF PROFICIENCY

	SREB	SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS				1990
	Simple Arithmetic Facts (150)	Beginning Skills and Understanding (200)	Basic Operations and Beginning Problem Solving (250)	Moderately Complex Procedures and Reasoning (300)	Multiple-Step Problem Solving and Algebra (350)	
SITE 1990	100.0	98.5	98.5	52.3	None	
SREB 1990	99.9	99.4	94.2	36.9	0.2	
NAT/TOT	100.0	100.0	95.0	50.3	5.2	
NAT/ACAD	100.0	100.0	98.8	75.0	10.2	
NAT/VOC	100.0	100.0	90.9	22.8	0.3	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Performance by Content and Process Areas

Another way of interpreting performance beyond examining what students can do at various levels along the mathematics scale is to review their mathematics performance by process skills -- what thought processes students should go through to correctly answer questions. (These skills are described in greater detail in the Appendix.) This can be especially helpful in determining the emphasis teachers may choose to place on various aspects of mathematics.

Table 10 shows that in all five process areas, Jonesboro vocational students were able to correctly answer a higher percentage of questions than students in each of the comparison groups except students in the 1986 national sample who were enrolled in the academic curriculum. In only one category -- problem solving/reasoning -- were Jonesboro students unable to answer at least half of the questions correctly.

TABLE 10
PERCENTAGE INDICATING CORRECT RESPONSES
BY MATHEMATICS PROCESS AREAS

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS		1990	
	<u>SITE 1990</u>	<u>SREB 1990</u>	<u>NAT/TOT</u>	<u>NAT/ACAD</u>	<u>NAT/VOC</u>
PROBLEM SOLVING/REASONING	47.9	43.7	46.3	53.6	38.6
ROUTINE APPLICATION	61.0	55.5	55.9	64.5	47.5
UNDERSTANDING/COMPREHENSION	51.6	46.1	49.3	57.9	41.8
SKILL	68.7	60.9	62.8	71.8	51.7
KNOWLEDGE	62.8	53.7	58.0	67.8	47.4

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Carrying the notion of process skills one step further, it is also useful to analyze the mathematics performance of students by content areas -- the specific types of knowledge students should possess to correctly answer questions. (These areas are described in greater detail in the Appendix.)

Table 11 indicates that in six of the seven content areas, Jonesboro students outperformed students in each of the comparison groups except national academic students; only in the data organization and interpretation category did Jonesboro students fall behind. In four of the seven categories -- measurement; geometry; relations, functions, and algebraic expressions; and numbers and operations -- Jonesboro students were able to correctly answer at least half of the questions.

TABLE 11
PERCENTAGE INDICATING CORRECT RESPONSES
BY MATHEMATICS CONTENT AREAS

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
	SITE 1990	SREB 1990	NAT/TOT	NAT/ACAD	NAT/VOC
FUNDAMENTAL METHODS	45.2	42.7	45.0	52.5	38.6
DISCRETE MATHEMATICS	49.0	42.6	44.9	53.4	39.3
DATA ORGANIZATION AND INTERPRETATION	41.1	42.3	44.6	49.7	39.2
MEASUREMENT	57.1	47.5	51.4	60.8	40.7
GEOMETRY	60.7	52.7	56.2	67.1	44.9
RELATIONS, FUNCTIONS, AND ALGEBRAIC EXPRESSIONS	51.5	44.6	48.1	58.8	35.5
NUMBERS AND OPERATIONS	67.2	60.2	61.7	70.2	53.1

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Performance by Course Experience

Table 12 shows the percentage of Jonesboro students who have taken various mathematics courses and the scores or proficiencies of those students by coursework. It is worth noting that most students who took higher-level courses had probably taken some of the lower-level courses as well. Hence, both the percentages and proficiency scores for these upper-level courses were often factored into more than one course. As expected, mathematics proficiency scores typically rise with more advanced levels of coursework.

Almost 85 percent of the 1990 Jonesboro vocational completers had taken first-year algebra (an increase of 12 percent from 1988), about 62 percent reported taking geometry (up 31 percent), and about 44 percent reported taking a second-year algebra course (an increase of 12 percent). Few Jonesboro students reported taking applied or technical mathematics courses, although the increase from 1988 to 1990 was significant (from 6.9 to 12.7 percent).

In none of the courses did mathematics achievement scores improve when comparing 1988 to 1990; however, Jonesboro students who had completed each mathematics course scored higher than students in the SREB Consortium who had taken the same courses.

TABLE 12

MATHEMATICS SCORES AND PERCENTAGE COMPLETING SPECIFIC MATHEMATICS COURSES

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS				1990	
	SITE 1990		SREB 1990		SITE 1988		
	PERCENT	SCORE	PERCENT	SCORE	PERCENT	SCORE	
GENERAL MATH*	83.3	299.2(1.7)	76.2	288.0(0.2)	77.2	292.3(0.6)	
BUS. & CONSUMER MATH*	47.7	293.7(1.8)	41.3	287.7(0.1)			
1ST YR. APPLIED MATH**	11.1	304.6(1.2)	16.0	286.1(0.4)	6.9	296.5(1.7)	
2ND YR. APPLIED MATH**	1.6	292.2(6.7)	4.7	280.3(0.7)			
PRE-ALGEBRA	62.1	299.8(1.6)	67.0	292.6(0.2)	55.9	298.7(0.9)	
ALGEBRA I	84.4	304.4(1.5)	70.7	296.0(0.1)	72.4	301.4(0.9)	
GEOMETRY	61.9	307.1(1.5)	47.3	300.0(0.2)	30.9	314.9(1.3)	
ALGEBRA II	43.8	309.7(2.0)	37.4	301.8(0.2)	31.0	310.0(1.0)	
TRIGONOMETRY	7.9	316.0(2.4)	11.5	307.0(0.6)	7.9	324.7(3.7)	
PRE-CALC. OR CALCULUS	4.8	315.9(3.5)	5.3	309.1(0.7)	1.4	326.3(4.8)	

* In 1988, these two courses were combined into one option.

** In 1988, these two courses were combined into one option.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

SCIENCE PROFICIENCY

Overview of Results

The science achievement of Jonesboro students showed a substantial increase of 19.1 points when compared with their 1988 assessment results, moving them beyond the SREB Consortium Goal of 280.7 for science proficiency. While Table 13 shows that the scores of Jonesboro students remain below the average for academic students in the national sample, Jonesboro completers now exceed the average for all students in the 1986 NAEP national sample.

TABLE 13

SCIENCE SCORES

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS	1990
		MEAN SCORE	
	SITE 1990	295.9(2.6)&	
	SREB 1990	265.5(0.4)	
	SITE 1988	276.8(1.4)	
	NAT/TOTAL	287.1(0.8)	
	NAT/ACAD	308.1(0.8)	
	NAT/VOCED	266.7(1.7)	
	SREB GOAL	280.7	

& Site 1990 is significantly different (statistically) from the SREB Goal.

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 14 shows that in 1990 both male and female students at Jonesboro scored higher in science proficiency than did Jonesboro students in 1988; the proficiency of male students increased dramatically by 26.2 points and exceeded the national average, while the scores for female students gained 8.1 points (due to the high standard error, the score for female students should be interpreted with caution). Consistent with national data, male students at Jonesboro achieved a higher level of science proficiency than did female students.

The same table indicates that in 1990 both Black and White students at Jonesboro scored significantly higher in science than they did in 1988; the scores of Black students rose by 57.9 points, while White students posted a gain of 16.1 points. Unlike national data, Black students at Jonesboro performed at nearly the same level in science as White students.

TABLE 14
SCIENCE SCORES
BY GENDER AND RACE/ETHNICITY

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
MEAN SCORE					
	<u>MALE</u>	<u>FEMALE</u>	<u>BLACK</u>	<u>WHITE</u>	
SITE 1990	301.0(1.6)	287.7(9.0)	293.2(2.7)	296.0(2.7)	
SREB 1990	269.1(0.5)	262.4(0.6)	240.9(0.3)	273.7(0.6)	
SITE 1988	274.8(2.0)	279.6(1.5)	235.3(5.7)	279.9(1.5)	
NAT/TOTAL	293.3(1.0)	280.8(0.9)	248.6(1.4)	297.0(0.8)	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 15 shows that at Jonesboro, by far the largest percentage of students are enrolled in technical programs (43.9 percent). Students enrolled in marketing, trade and industrial, and technical programs posted the highest science achievement scores. However, due to the high standard errors for most of the vocational programs, the science scores for these programs should be interpreted with caution.)

TABLE 15
SCIENCE SCORES AND
PERCENTAGE ENROLLED, BY VOCATIONAL PROGRAM

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS		1990	
	SITE 1990		SREB 1990		
	PERCENT	SCORE	PERCENT	SCORE	
AGRICULTURE	4.5	236.8(10.7)	6.5	268.9(1.7)	
BUSINESS AND OFFICE	12.1	287.7(14.0)	27.2	268.9(0.7)	
HEALTH	3.0	251.5(17.6)	6.9	260.9(1.2)	
HOME ECONOMICS	4.5	260.2(5.5)	8.0	242.4(1.9)	
MARKETING	6.1	316.6(7.9)	8.6	264.1(0.7)	
TECHNICAL	43.9	300.4(2.1)	17.9	278.2(0.7)	
TRADE AND INDUSTRIAL	25.8	309.0(1.9)	20.8	262.9(0.7)	
SREB GOAL				280.7	

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Levels of Science Proficiency

The NAEP-defined Levels of Proficiency, described in the Appendix, provide a helpful way to understand how students at Jonesboro distribute themselves along the science scale. The five Levels of Proficiency add real meaning to the scores by helping to convey what students at each level are actually able to do.

Table 16 shows how students at Jonesboro performed at each of the five levels of science proficiency. At four of the five levels, Jonesboro completers exceeded the performance of all students in the SREB Consortium and vocational students in the 1986 NAEP national sample. At the third and fourth levels -- where students must be able to apply basic scientific information and analyze scientific procedures and data -- Jonesboro students also outperformed all students in the national sample.

TABLE 16
PERCENTAGE PERFORMING AT OR ABOVE
EACH SCIENCE LEVEL OF PROFICIENCY

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS				1990
	Knows Everyday Scientific Facts (150)	Understands Simple Scientific Principles (200)	Applies Basic Scientific Information (250)	Analyzes Scientific Procedures and Data (300)	Integrates Specialized Scientific Information (350)	
SITE 1990	98.5	98.5	92.3	52.3	4.6	
SREB 1990	98.7	91.5	67.4	22.8	1.7	
NAT/TOT	100.0	98.9	81.9	38.2	5.3	
NAT/ACAD	100.0	99.8	93.7	61.4	10.6	
NAT/VOC	98.8	97.5	70.3	14.8	0.1	

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Performance by Content and Process Areas

Another way of interpreting performance beyond examining what students can do at various levels along the science scale is to review their science performance by process skills -- what thought processes students should go through to correctly answer questions. (These skills are described in greater detail in the Appendix.) This can be especially helpful in determining the emphasis teachers may choose to place on various aspects of science.

Table 17 shows that in all three process areas, Jonesboro students were able to correctly answer a higher percentage of questions than could students in the SREB Consortium, all students in the national sample, and national vocational students. In addition, in all three categories, the performance of Jonesboro students was not far behind that of academic students in the national sample.

TABLE 17
PERCENTAGE INDICATING CORRECT RESPONSES
BY SCIENCE PROCESS AREAS

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
	SITE 1990	SREB 1990	NAT/TOT	NAT/ACAD	NAT/VOC
KNOWS	62.7	51.2	56.6	64.0	48.7
USES	52.1	41.4	49.0	56.0	41.5
INTEGRATES	52.1	42.0	48.5	54.0	42.3

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Carrying the notion of process skills one step further, it is also useful to analyze the science performance of students by content areas -- the specific types of knowledge students should possess to correctly answer questions. (These areas are described in greater detail in the Appendix.)

Table 18 indicates that once again, the performance of Jonesboro students exceeded that of students in the SREB Consortium, of all students in the nation, and of national vocational students. Except for the category of chemistry, Jonesboro students achieved at levels similar to those of students in the national sample who indicated that they were enrolled in the college preparatory curriculum.

TABLE 18
PERCENTAGE INDICATING CORRECT RESPONSES
BY SCIENCE CONTENT AREAS

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
	<u>SITE 1990</u>	<u>SREB 1990</u>	<u>NAT/TOT</u>	<u>NAT/ACAD</u>	<u>NAT/VOC</u>
LIFE SCIENCES	61.3	47.5	54.8	62.4	47.2
PHYSICS	60.0	48.3	55.8	61.4	49.5
CHEMISTRY	39.5	38.3	43.8	48.7	37.2
EARTH AND SPACE SCIENCES	64.1	48.7	57.9	65.4	48.4
HISTORY OF SCIENCE	48.2	37.5	43.2	50.0	35.5
NATURE OF SCIENCE	42.0	36.2	40.0	46.1	35.2

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Performance by Course Experience

Table 19 shows the range of science courses taken by Jonesboro students and the associated achievement scores. Almost every Jonesboro vocational completer indicated that they had taken biology, yet fewer than 20 percent had completed chemistry and less than 5 percent had taken physics. The percentage of students completing a course in applied physics did not increase substantially from 1988 to 1990, and remained very low -- less than 2 percent. In two of the courses -- general science and biology -- the science achievement scores for students completing these courses improved when comparing 1988 to 1990. In addition, the scores for all of the courses in 1990 except applied biology/chemistry exceeded the SREB Consortium Goal of 280.7 for science achievement.

TABLE 19
SCIENCE SCORES AND PERCENTAGE
COMPLETING SPECIFIC
SCIENCE COURSES

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS				1990	
	SITE 1990		SREB 1990		SITE 1988		
	PERCENT	SCORE	PERCENT	SCORE	PERCENT	SCORE	
GENERAL SCIENCE	80.3	296.1(2.7)	69.4	264.7(0.5)	89.5	277.0(0.9)	
PHYSICAL SCIENCE	93.7	298.2(2.8)	84.7	266.5(0.3)	NOT ASKED		
EARTH SCIENCE	89.1	300.1(1.8)	59.9	267.5(0.8)	NOT ASKED		
LIFE SCIENCE	73.8	298.0(1.6)	39.7	267.2(1.0)	NOT ASKED		
BIOLOGY (LAB)*	97.0	295.0(2.7)	89.7	267.5(0.5)	92.4	277.8(1.9)	
CHEMISTRY (LAB)*	17.2	304.2(2.6)	29.2	283.5(0.5)	10.7	306.6(7.0)	
PHYSICS (LAB)*	4.7	290.4(8.7)	8.2	282.8(1.1)	7.9	304.6(3.6)	
1ST YR. APPLIED PHYSICS**	1.7	326.4(5.9)	6.2	277.2(2.1)	1.4	306.7(8.3)	
2ND YR. APPLIED PHYSICS**	None	None	1.4	266.1(3.2)			
APPLIED BIOLOGY/CHEMISTRY	7.9	278.1(5.4)	6.4	264.8(1.1)	NOT ASKED		

* In 1988, students were not asked if these were lab-based courses.

** In 1988, these two courses were combined into one option

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

STUDENT ATTITUDES AND PLANS

Students were asked to respond to questions about their attitudes or perceptions about their coursework and how their teachers may have viewed their teaching tasks. Table 20 shows that the percentage of students indicating positive responses about their teachers and coursework decreased for all but one (encouraged to take more math and science courses) of the five questions below when compared to 1988 data. The most significant declines occurred when students were asked if their courses were challenging (a drop of 14 percent) and if their guidance counselor helped them to develop a four-year plan for high school (a decrease of 10 percent). In terms of actual responses, only half of the completers at Jonesboro indicated that their courses were challenging and exciting and fewer than one-third reported that a counselor had helped them develop a four-year plan of study.

TABLE 20

STUDENT ATTITUDES TOWARD SCHOOL, TEACHERS, AND COURSEWORK

	SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990		
				PERCENTAGE OF STUDENTS		
	SITE 1990	SREB 1990	SITE 1988			
MOST COURSES WERE CHALLENGING AND EXCITING						
AGREE	50.0	64.3	64.4			
DISAGREE	50.0	35.7	35.6			
MOST TEACHERS RELATED SUBJECT TO REAL WORLD						
AGREE	73.8	79.6	74.5			
DISAGREE	26.2	20.4	25.5			
I WAS ENCOURAGED TO TAKE MORE MATH & SCIENCE COURSES						
AGREE	56.9	50.7	50.0			
DISAGREE	43.1	49.3	50.0			
TEACHERS DID NOT EXPECT OR ENCOURAGE ME TO DO WELL						
AGREE	13.8	13.8	12.3			
DISAGREE	86.2	86.2	87.7			
GUIDANCE COUNSELOR HELPED DEVELOP A 4-YEAR PLAN						
AGREE	31.3	48.8	41.1			
DISAGREE	68.8	51.2	58.9			

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 21 reports the extent to which vocational education teachers stressed the importance of reading, mathematics, or science skills. A little more than one-third of the Jonesboro students reported that teachers often stressed the importance of reading, significantly below the SREB average; responses for mathematics and science were well above the SREB averages. Comparing 1988 to 1990, increases occurred in the percentages of Jonesboro students indicating that their vocational teachers often stressed the importance of mathematics and science (increases of 6 and 3 percent, respectively).

TABLE 21
IMPORTANCE GIVEN BY VOCATIONAL TEACHERS
TO READING, MATHEMATICS, AND SCIENCE

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
		PERCENTAGE OF STUDENTS			
		READING	MATH	SCIENCE	
NEVER STRESSED					
SITE 1990		20.0	12.3	29.2	
SREB 1990		12.5	10.2	28.1	
SITE 1988		15.2	14.4	27.6	
SELDOM STRESSED					
SITE 1990		32.3	20.0	26.2	
SREB 1990		29.4	25.8	31.8	
SITE 1988		27.2	17.8	24.8	
OFTEN STRESSED					
SITE 1990		36.9	63.1	32.3	
SREB 1990		47.8	56.9	26.0	
SITE 1988		39.7	57.5	29.0	
I DON'T RECALL					
SITE 1990		10.8	4.6	12.3	
SREB 1990		10.3	7.1	14.1	
SITE 1988		17.9	10.3	18.6	

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score – referred to as the confidence interval – allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 22 provides the percentage of Jonesboro students who reported being absent to some degree during the month prior to being assessed (March or April 1990). Although there may have been some difference in the dates of the 1988 and 1990 assessments, the percentage of Jonesboro students reporting no absences the previous month increased by 5.7 percent (from 18.5 to 24.2 percent). Jonesboro students also reported important improvement in their attendance records at the level of a week or more absences (five or more days); from 11.0 to 7.6 percent.

TABLE 22

**PERCENTAGE OF STUDENTS AND PERFORMANCE
BY NUMBER OF DAYS ABSENT IN LAST MONTH**

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990
		PERCENT OF STUDENTS	MEAN SCORE (SE)		
			READING	MATH	SCIENCE
NONE					
	SITE 1990	24.2	57.2(1.5)	305.0(2.1)	305.5(3.7)
	SREB 1990	26.9	53.0(0.1)	290.8(0.4)	267.4(1.0)
	SITE 1988	18.5	54.4(0.3)	296.0(1.0)	278.8(2.7)
1-2 DAYS					
	SITE 1990	40.9	56.1(0.4)	303.9(0.5)	292.2(2.5)
	SREB 1990	37.9	53.7(0.1)	292.0(0.2)	268.1(0.6)
	SITE 1988	41.8	56.6(0.5)	295.6(0.6)	280.6(2.0)
3-4 DAYS					
	SITE 1990	27.3	54.3(0.5)	288.2(5.2)	288.9(8.4)
	SREB 1990	22.3	52.7(0.1)	288.7(0.6)	263.6(0.3)
	SITE 1988	26.7	53.6(0.4)	291.6(0.7)	278.9(1.8)
5-10 DAYS					
	SITE 1990	7.6	52.0(1.1)	296.4(2.2)	309.8(7.1)
	SREB 1990	10.0	50.4(0.3)	287.5(1.1)	259.0(1.4)
	SITE 1988	11.0	52.5(1.1)	287.2(1.4)	262.9(3.6)
MORE THAN 10 DAYS					
	SITE 1990	None	None	None	None
	SREB 1990	2.8	50.6(0.4)	286.8(2.1)	260.6(2.2)
	SITE 1988	2.1	47.8(1.1)	261.0(3.0)	237.2(6.8)

National values are based on 1986 data.

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score - referred to as the confidence interval - allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

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Jonesboro students were asked to agree or disagree with a number of statements concerning how their high school education prepared them for the future. Table 23 indicates that for five of the six statements (all except perform at the entry level) fewer 1990 Jonesboro students agreed with the statements than did Jonesboro students in 1988. At least 90 percent of the Jonesboro students felt prepared to read, understand, and apply technical information; able to identify and solve problems; and able to perform at the entry level of their chosen occupation. About 83 percent reported that they understood why things worked in their chosen field. About three-fourths of Jonesboro vocational education students were confident that the school had prepared them to enter and succeed in technical school; less than two-thirds of the students reported that they were prepared to enter and succeed in college.

TABLE 23
STUDENT PERCEPTIONS ABOUT
SCHOOL PREPARATION

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS		1990
PERCENTAGE OF STUDENTS				
	SITE 1990	SREB 1990	SITE 1988	
READ, UNDERSTAND AND APPLY TECHNICAL INFORMATION				
AGREE	90.6	92.0	92.4	
DISAGREE	9.4	8.0	7.6	
UNDERSTAND WHY THINGS WORK IN MY FIELD				
AGREE	82.8	86.8	89.0	
DISAGREE	17.2	13.2	11.0	
IDENTIFY AND SOLVE PROBLEMS				
AGREE	92.2	91.7	92.7	
DISAGREE	7.8	8.3	7.3	
ENTER AND SUCCEED IN TECHNICAL SCHOOL				
AGREE	74.6	76.0	82.5	
DISAGREE	25.4	24.0	17.5	
ENTER AND SUCCEED IN COLLEGE				
AGREE	65.6	70.8	71.3	
DISAGREE	34.4	29.2	28.7	
PERFORM AT THE ENTRY LEVEL IN MY CHOSEN OCCUPATION				
AGREE	92.2	89.4	91.1	
DISAGREE	7.8	10.6	8.9	

Table 24 shows the amount of time Jonesboro students reported spending on homework each day. Of particular note is that very little progress was made from 1988 in the percentage of Jonesboro completers in 1990 who reported that they did not do any homework -- 44 percent in 1990 compared to 46 percent in 1988. Less than 30 percent of Jonesboro students reported spending about one hour on homework each day, but this was an increase of almost 10 percent when compared to the response of Jonesboro students in 1988. As one might expect, students who spend increasingly more time on homework (up to two hours) generally have progressively higher achievement scores.

TABLE 24

**PERCENTAGE OF STUDENTS AND PERFORMANCE
BY THE AMOUNT OF TIME SPENT
ON HOMEWORK EACH DAY**

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS		1990	
	PERCENT OF STUDENTS	MEAN SCORE (SE)			
		READING	MATH	SCIENCE	
I USUALLY DON'T HAVE HOMEWORK ASSIGNED					
SITE 1990	34.8	56.0(0.4)	297.4(2.0)	301.9(3.6)	
SREB 1990	24.6	51.5(0.1)	287.9(0.7)	261.0(1.7)	
SITE 1988	38.4	54.5(0.3)	289.8(0.9)	277.8(2.2)	
NAT/TOT	7.6	49.5(0.4)	280.8(1.2)	268.8(1.5)	
I HAVE HOMEWORK, BUT I DON'T USUALLY DO IT					
SITE 1990	9.1	58.3(1.4)	301.8(1.7)	301.2(5.9)	
SREB 1990	6.3	50.4(0.2)	291.0(0.7)	268.7(1.6)	
SITE 1988	7.5	52.7(0.3)	298.6(1.0)	267.2(3.0)	
NAT/TOT	9.6	52.1(0.4)	296.1(1.1)	283.7(1.5)	
ONE-HALF HOUR OR LESS					
SITE 1990	19.7	51.4(1.4)	302.9(2.1)	285.5(5.2)	
SREB 1990	23.6	53.7(0.1)	292.1(0.3)	269.8(0.8)	
SITE 1988	24.0	55.5(0.5)	295.8(1.6)	278.8(3.5)	
NAT/TOT	18.9	54.6(0.2)	299.0(0.9)	285.2(1.2)	
ONE HOUR					
SITE 1990	28.8	56.6(1.1)	297.8(4.4)	294.4(3.9)	
SREB 1990	30.0	53.4(0.1)	290.5(0.3)	265.3(1.0)	
SITE 1988	19.9	55.6(0.7)	298.0(1.5)	284.5(4.2)	
NAT/TOT	34.7	55.4(0.2)	302.2(1.0)	289.6(1.0)	
TWO HOURS					
SITE 1990	7.6	56.7(1.6)	301.6(3.9)	294.2(9.6)	
SREB 1990	11.5	53.9(0.3)	291.4(0.8)	269.3(1.1)	
SITE 1988	6.2	54.0(0.7)	286.6(2.6)	261.8(7.3)	
NAT/TOT	18.7	57.0(0.3)	304.9(1.1)	289.7(1.3)	
MORE THAN TWO HOURS					
SITE 1990	None	None	None	None	
SREB 1990	3.9	53.2(0.1)	289.5(0.9)	259.5(1.1)	
SITE 1988	4.1	53.0(1.5)	280.7(3.7)	264.1(8.9)	
NAT/TOT	10.5	57.0(0.4)	311.1(1.7)	295.8(2.8)	

The numbers in () represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to a mean or average score -- referred to as the confidence interval -- allows one to be 95 percent sure that the mean score for each group falls somewhere within that range. If the confidence intervals of two mean scores overlap, the scores are not significantly different.

Table 25 shows that after leaving high school, the vast majority (40 percent) of Jonesboro students plan to seek full-time employment, a figure consistent with 1988 data and the SREB Consortium average. For the most part, the plans of 1990 Jonesboro completers are consistent with those of 1988 Jonesboro completers, with the exception of taking vocational courses at a community college and working part time, both of which posted increases; and taking courses at a trade school and taking academic courses at a community college, both of which posted declines.

TABLE 25
PERCENTAGE AND PERFORMANCE OF
STUDENTS BY POST-HIGH SCHOOL PLANS

SREB		SREB-STATE VOCATIONAL EDUCATION CONSORTIUM STUDENT ASSESSMENT RESULTS			1990	
		PERCENT OF STUDENTS	MEAN SCORE (SE)			
			READING	MATH	SCIENCE	
WORKING FULL TIME						
	SITE 1990	40.0	52.6(0.6)	289.0(4.2)	287.6(5.2)	
	SREB 1990	37.2	50.4(0.1)	285.4(0.3)	256.9(0.9)	
	SITE 1988	40.0	52.6(0.3)	285.3(1.0)	264.8(2.4)	
APPRENTICESHIP OR ON-THE-JOB TRAINING						
	SITE 1990	1.5	60.4(2.4)	324.6(5.0)	292.4(19.0)	
	SREB 1990	2.9	50.7(0.6)	287.2(1.1)	262.3(1.1)	
	SITE 1988	1.4	64.8(2.0)	320.6(4.3)	323.1(12.4)	
MILITARY SERVICE						
	SITE 1990	10.8	57.6(1.0)	309.2(3.6)	310.2(1.7)	
	SREB 1990	8.1	51.8(0.2)	288.2(0.6)	265.5(2.3)	
	SITE 1988	10.7	51.4(0.7)	288.1(2.6)	268.2(7.5)	
FULL-TIME HOMEMAKER						
	SITE 1990	None	None	None	None	
	SREB 1990	0.7	53.8(1.4)	279.5(2.9)	268.9(3.7)	
	SITE 1988	2.1	55.3(1.4)	289.6(2.5)	283.7(5.2)	
COURSES AT A TRADE OR BUSINESS SCHOOL						
	SITE 1990	15.4	59.3(1.3)	304.5(1.8)	304.6(3.7)	
	SREB 1990	12.0	53.1(0.1)	287.9(0.9)	263.4(0.7)	
	SITE 1988	18.6	57.1(0.7)	296.4(1.2)	286.6(3.0)	
ACADEMIC COURSES AT COMMUNITY COLLEGE						
	SITE 1990	1.5	65.9(5.4)	282.2(10.3)	290.2(16.4)	
	SREB 1990	11.6	55.0(0.2)	294.5(0.6)	270.7(1.3)	
	SITE 1988	3.6	57.2(1.2)	297.6(2.9)	257.8(8.0)	
VOC-TECH COURSES AT COMMUNITY COLLEGE						
	SITE 1990	4.6	53.9(2.0)	295.2(5.2)	296.3(4.2)	
	SREB 1990	6.7	53.7(0.3)	291.2(0.9)	268.9(0.8)	
	SITE 1988	0.7	39.9(2.3)	266.8(17.2)	244.0(41.6)	
FOUR-YEAR COLLEGE						
	SITE 1990	21.5	56.5(0.4)	310.8(1.4)	300.5(3.0)	
	SREB 1990	20.7	56.7(0.2)	300.8(0.4)	281.0(0.9)	
	SITE 1988	20.7	58.8(0.5)	310.0(1.0)	299.5(2.4)	
WORKING PART TIME						
	SITE 1990	3.1	61.0(2.5)	303.0(4.5)	290.2(10.5)	
	SREB 1990	2.0	53.3(0.4)	284.6(1.0)	262.4(3.2)	
	SITE 1988	0.7	41.8(4.2)	251.8(5.4)	263.0(9.1)	

JONESBORO VOCATIONAL HIGH SCHOOL
SITE REPORT

1990

Southern Regional Education Board

Introduction

In 1986, 13 members of the Southern Regional Education Board formed the SREB-State Vocational Consortium.¹ The purpose of this group is to develop and apply basic competencies in communications, mathematics, science, critical thinking, and problem solving for students enrolled in vocational programs.

To meet these broad objectives, the SREB Consortium has developed a list of challenges for high schools:

- Teachers, administrators, and students must raise their expectations for students completing vocational concentrations.
- Schools must improve the leadership, training, and management skills of educators.
- Vocational teachers must place greater emphasis on basic competencies in vocational classes. Correspondingly, academic teachers must place greater emphasis on applied learning in academic courses.
- Schools must design and implement applied academic courses to teach basic competencies to vocational students.

Presently, 33 sites have agreed to participate in the SREB Consortium six-year project. Schools participating in the program are working along with state and local education agencies and other members of the consortium. Each site has developed a detailed plan of activities to accomplish the Consortium's goals.

An integral part of the pilot program includes assessing the progress made by the SREB sites toward implementing their individual plans and meeting the SREB goals. Four types of data were collected for the 1988-89 assessment. First, the National Assessment of Educational Progress (NAEP) reading, mathematics, and science proficiency exams were given to vocational completers who graduated in 1988. The results of these exams will be used to make comparisons between the performance of SREB students and students

¹ The 13 states include Alabama, Arkansas, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia. Louisiana joined the SREB consortium in 1989, bringing the total number of states participating in the consortium to 14.

nationally. High school transcripts were collected to determine the number and types of courses completed by SREB vocational students. Student follow-up surveys were administered to vocational completers 10 to 14 months after graduation. The surveys document students' educational and employment activities following high school graduation and provide them with an opportunity to comment on their sense of preparedness after graduation. In addition to these assessments, a secondary school personnel survey was administered to school administrators, counselors, vocational and non-vocational teachers at each site to obtain their opinions about the integration of academic and vocational education and to assess their efforts in this area.

This report combines information from student transcripts and student follow-up questionnaires to create an overview of graduates from the class of 1988 who participated in the SREB initiative. The personnel data provides information regarding the attitudes and behavior of staff who are responsible for the actual implementation of the program goals. More importantly, this information provides a basis for comparing SREB students and personnel in the future.

Some caution should be used in interpreting the results found in this report. The percentages and means shown in this report are based on very small numbers of students. Consequently, these estimates are subject to variation. Often, calculated differences between groups (i.e., students from various vocational programs) can be attributed to the small number of students in the group instead of actual differences between the groups.

Caution should also be used in comparing transcript information from different SREB sites. As part of the 1988 transcript study, each school was asked to code for each student the number of courses taken in several vocational and academic subject areas. However, schools may not have coded courses in a uniform manner. Consequently, similar courses may have been placed into different categories. For example, some SREB schools may have considered business English a business course while others may have considered it an English course.

Outline of this Report

This site report is based on information collected from Jonesboro Vocational High School. The sample includes all reporting seniors who graduated from this SREB pilot site in the spring of 1988. The terms "vocational completers," "SREB graduates," and "Jonesboro Vocational students" all refer to this group.

This report is divided into four sections. Section One provides a general overview of the kinds of courses taken by SREB vocational students. Section Two describes students' school and work activities following high school completion. The third section of this report describes students' impressions of their high school experiences. The final section presents data on the attitudes of school personnel regarding the integration of vocational and academic education and their efforts in this area.

A description of the sample and coding of courses from the student transcripts is contained in the technical appendix, which also describes the procedures used in preparing this report.

Section One

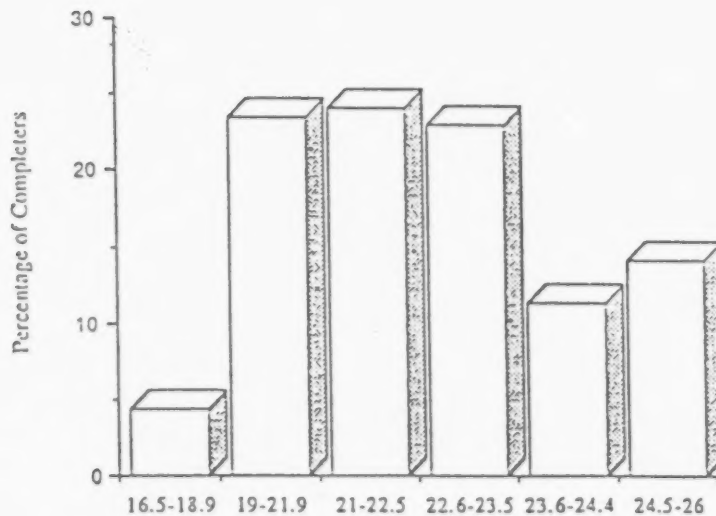
Overview of High School Course-Taking Patterns

This section describes the general course-taking patterns of vocational completers from Jonesboro Vocational High School. Coursework has been defined in terms of the number of credits taken, where a "credit" represents a single period course taken for a full school year.

The numbers and percentages shown here are based on those vocational completers who provided transcript information. Of the 157 reporting vocational completers who graduated from Jonesboro Vocational High School, 141 respondents supplied transcripts resulting in a response rate of 90 percent.

- Students completed an average of 22 credits in academic, vocational and other subjects. This averages to over 5 courses per year over four years. The number of courses completed by 1988 graduates varied somewhat. Figure 1 below shows the percentage of completers taking different numbers of total credits.

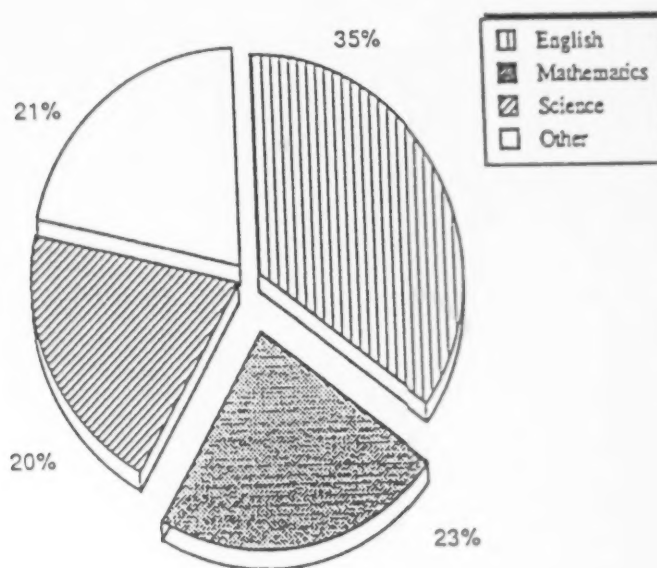
Figure 1
Total Credits Taken by Vocational Completers
(N=141)



Academic Credits

- More than one-half (12 credits) of the courses taken by SREB students were in academic subjects.
- Thirty-five percent of all academic credits were in English, 23 percent were in mathematics, and 20 percent were in science. The remaining academic credits were completed in other academic subjects such as social studies, foreign languages, and fine arts.

Figure 2
Distribution of Academic Credits for Vocational Completers
(N=141)

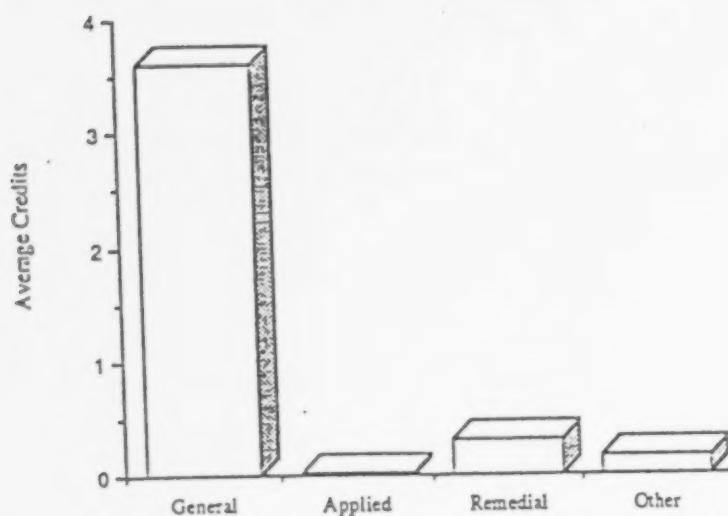


English Credits

- Figure 3 shows the kinds of English credits earned by vocational completers. On average, graduates completed 4.2 credits in English.
- Most English courses taken were in general English (3.6 credits).

- Less than 0.1 credits were reported in Applied English, and 0.3 credits were reported in Remedial English courses.
- The remaining credits taken in English were in literature, composition, speech, and other English courses.

Figure 3
Kinds of English Credits Earned by Vocational Completers
(N=141)

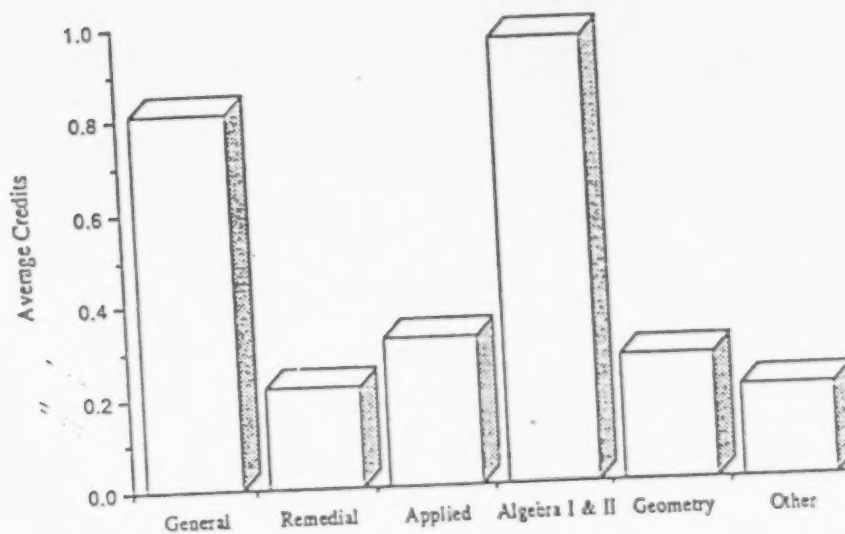


Mathematics Credits

- Jonesboro Vocational students completed just under three years of mathematics (2.8 credits). Figure 4 shows the kinds of mathematics credits earned.
- Vocational students completed 0.8 credits in general mathematics. Sixty-three percent of the vocational completers took general mathematics.
- On average vocational students completed 0.3 credits in Applied Math, and 0.2 credits in Remedial Math.
- Thirty-two percent of vocational students earned credits in Applied Math, and 14 percent earned credits in Remedial Mathematics.

- On average, Algebra I and II together accounted for one credit.
- Seventy percent of the vocational students took Algebra I, and 27 percent had credits in Algebra II.
- Geometry courses accounted for an average of 0.3 credits. Twenty-eight percent of Jonesboro Vocational completers took Geometry.
- Five percent of the vocational completers reported taking more advanced math courses in either Trigonometry or Calculus.

Figure 4
Types of Mathematics Credits Earned by Completers
(N=141)

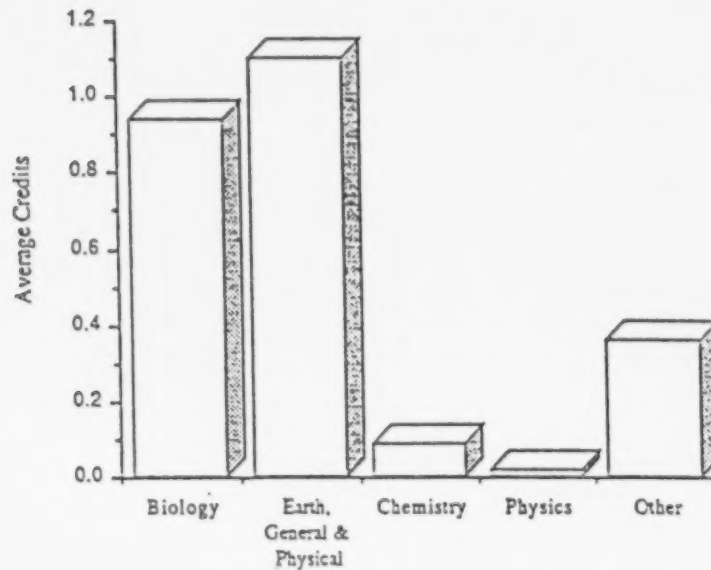


Science Credits

- SREB graduates typically completed over two years of science (2.5 credits). Figure 5 shows the kinds of science courses taken by vocational completers.
- Coursework in the biological sciences—general biology, advanced biology, zoology, and botany—accounted for 0.9 science credits.
- About 1.1 credits were taken in general, physical, and earth science.

- Students completed less than 0.1 credits in Chemistry and Physics.
- Four tenths of a credit was completed in the other science courses category.

Figure 5
Kinds of Science Courses Taken by Completers
(N=141)



Vocational Credits

The vocational curriculum can be divided into two parts: courses that offer general or introductory skills not related to a particular occupation and courses designed to impart skills and training in a specific occupational area. To reflect this distinction, the SREB 1988 transcript collected two types of information on vocational credits. First, data were collected on the number of general or pre-vocational courses taken. Second, data were collected on the number of occupationally specific courses completed in the student's vocational specialty.

- Students from Jonesboro Vocational High School completed about 3.4 credits in pre-vocational courses.

- The largest portion of pre-vocational credits were taken in introductory business skill courses such as general typing, accounting, basic management, and computers (1.3 credits).
- Students also took courses in Home Economics, such as family management, home nutrition, adult roles and development, and so on (0.6 credits).
- Agricultural courses accounted for 0.6 credits and 0.4 credits were reported in introductory Industrial Arts courses. The remaining credits were taken in other pre-vocational courses such as career exploration, job skills, and other general pre-vocational classes.

Program Concentrations

One component of the SREB initiative is to encourage students to develop a planned sequence of courses that will allow them to develop expertise in a specific occupational area. In particular, one goal is to have all SREB vocational students complete four or more credits in their vocational program. Table 1 shows the average credits completed in specific vocational program areas.

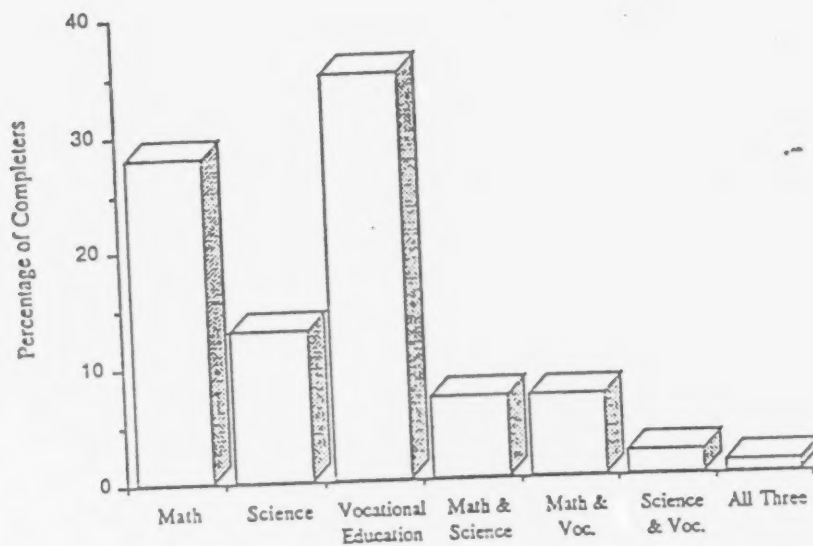
Table 1
Average Credits Completed in Specific Vocational Program Areas

	Credits	(N)
All Jonesboro Vocational Vocational Students	3.8	141
Nursing/Related	3.4	18
Advertising	3.7	15
Data Processing	3.2	15
Mechanics & Repair	4.6	13
Graphics & Printing	3.4	12
Vehicle/Mobile Equipment	3.8	12
Drafting	3.2	11
Construction Trades	4.4	9
Food Production & Management	3.7	9
Electrical/Electronics	4.1	8
Heating/Air Conditioning	4.4	8
Horticulture	3.6	7
Precision Metal Working	5.2	4

least 2 credits in algebra, geometry, trigonometry, or advanced mathematics; (2) 3 or more science credits with at least 2 credits in biology, chemistry, or physics; and (3) 4 credits in the student's vocational specialty.

- Thirty-five percent of the vocational completers completed 4 or more credits in their vocational specialty. Figure 6 shows the percent of completers who fulfilled SREB course objectives.
- Twenty-eight percent of completers fulfilled the mathematics requirement. That is, these students had 3 or more credits in mathematics with at least 2 credits in higher level mathematics.
- Thirteen percent of completers met the goals set for science education.
- A smaller proportion of the SREB completers (7 percent) met both the math and science goals and 7 percent of students completed the recommended number of credits in math and vocational education.
- Only 2 percent completed the desired amount of science and vocational education.
- One percent fulfilled all three coursework recommendations set forth by the SREB Consortium.

Figure 6
Percent of Completers Who Fulfilled SREB Course Objectives
(N=141)



Section Two

Activities After High School

Vocational completers engaged in a wide variety of activities after finishing high school. Eighty-five percent of the vocational completers who responded to the follow-up survey worked full- or part-time. Thirty-five percent of Jonesboro Vocational graduates continued their education in some form of a postsecondary institution. Forty-nine percent of those enrolled in postsecondary education continued their education at a 4 year college or university. Five percent went on to a 2 year college, and 42 percent to a vocational school. Only 9 students reported being enlisted in the military. A small number of the students (3 percent) enrolled in a state or federal job training program.² The next section describes the activities of the 1988 vocational completers in greater detail.

The numbers and percentages shown here are based on those vocational completers who answered the student follow-up survey. Of the 157 reporting vocational completers who graduated from Jonesboro Vocational, 119 responded to the follow-up survey and provided enough complete information to permit analysis of their data. The resulting effective response rate was 76 percent. The information shown here might be different if all of the students had responded.

Table 2
Activities After Graduation

School	35 %
Work	85
Military	8
Training Program	3
	(N = 119)

Postsecondary Education

After high school many students enrolled in some kind of postsecondary education. Table 3 shows the percent of vocational completers (who responded to the follow-up survey) who entered different types of schools.

² Because students often engaged in more than one activity, the percentages described here sum to more than 100 percent.

- About 49 percent of the vocational completers who were enrolled in postsecondary education attended a four-year college or university.
- Forty-two percent of vocational completers enrolled in postsecondary education enrolled in a postsecondary vocational school.
- Five percent of the reporting students enrolled in postsecondary education were enrolled in a two-year community or junior college.

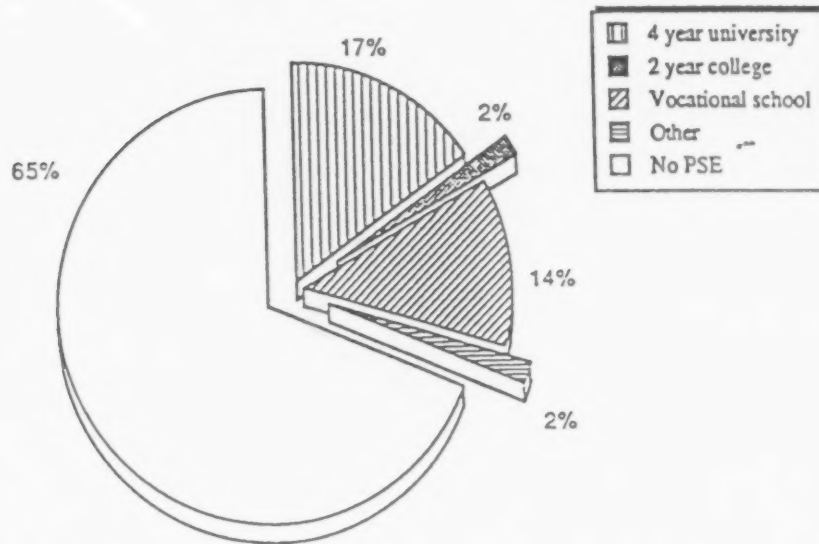
Table 3
Distribution of Vocational Completers
in Postsecondary Education[†]

	Percent of	
	All Completers	Completers in School
Colleges and universities	17	49
Community and junior colleges	2	5
Vocational schools	14	42
Other	<u>2</u>	<u>5</u>
Any school	35% (N=42)	100% (N=119)

- As shown in Figure 7, among all students, seventeen percent were enrolled in 4 year universities, and fourteen percent in vocational schools.

[†] Due to rounding, the percentages shown may not sum to 100.

Figure 7
Kinds of Schools Attended by Vocational Completers
(N=119)



- Approximately 53 percent of the students who went on to further education were enrolled in postsecondary programs related to their high school vocational program.
- Seventy-five percent of the students who went to school also worked during the first six months after high school. Forty-one percent of these students reported working full-time, another twenty-four percent reported working half-time and about 34 percent reported working part-time.

Military

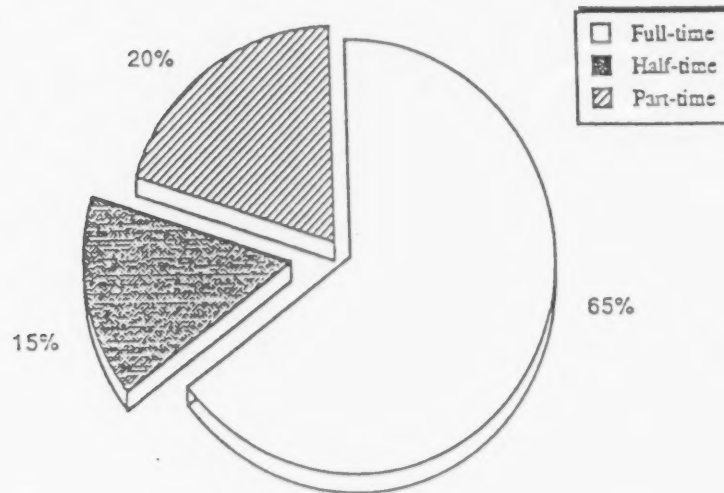
- Eight percent of the vocational completers entered the military after graduation.

Employment

- Eighty-five percent of the vocational graduates worked at some point after leaving high school.

- Approximately 65 percent of the graduates who were employed worked full-time. Fifteen percent worked half-time (between 20 and 35 hours per week). The remaining completers worked part-time or less than 20 hours per week.

Figure 8
Employment Status of Jonesboro Vocational Vocational Completers
Who Worked
(N=100)



- Students were employed in a range of positions (see Table 4).
- Approximately 55 percent of the students who worked were employed in sales, administration, clerical, or service positions.
- Fourteen percent of the students who worked were employed as machine operators.

Table 4
Occupations of Jonesboro Vocational Graduates

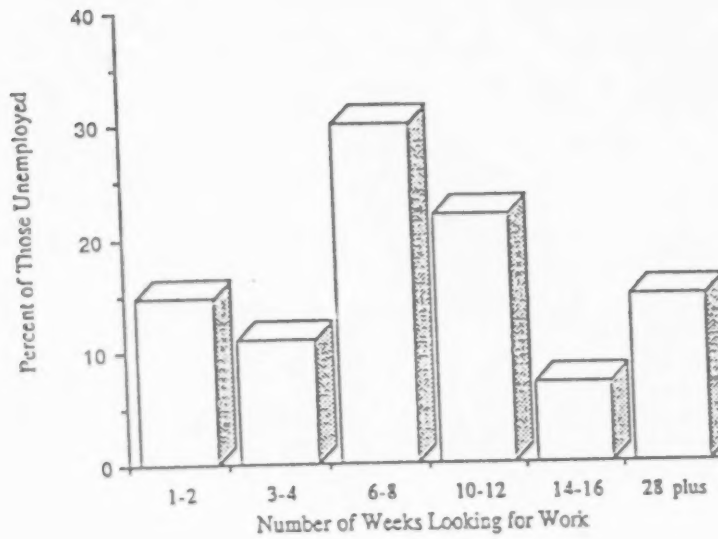
Sales	24 percent
Service Occupation	22
Machine Operator	14
Admin./Clerical	9
Equipment/Laborer	8
Precision Production	8
Construction Trades	5
Mechanics/Repair	3
Private Household	2
Technical Support	2
Agricultural/Related	1
Education	1
Medical	1
Transport/Moving	1

- The average hourly wage for 1988 graduates over four dollars per hour (\$4.60 per hour).
- The average hourly part-time wage was \$3.63 per hour, the average hourly half-time wage was \$4.25 per hour, while the average full-time wage was \$4.98 per hour.

Unemployment

- Twenty-eight percent of the responding vocational completers reported being out of a job and looking for work at some time during the six months after graduation.
- The average amount of time spent looking for a job, among those who were unemployed, was 11 weeks.

Figure 9
Number of Weeks Spent Looking for a Job Among Students Who were Ever
Unemployed
(N=27)



Section Three

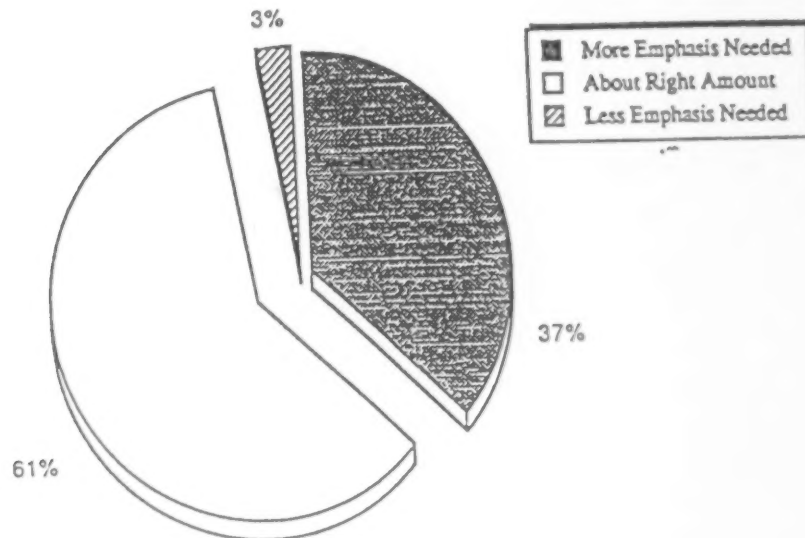
Student Perceptions of Their High School Experience

The primary objective of the SREB Consortium is to improve the basic competencies of vocational students. In accomplishing this objective, the program hopes to better prepare students for activities after graduation (either school or work). As part of the follow-up survey, vocational students who graduated in 1988 were asked whether or not they felt their vocational program placed the correct amount of emphasis on basic competencies. Students' reflections on their high school education can serve as an indication of the components of the program that have been and currently are successful. More importantly, students' opinions can be used to identify areas for future improvement.

Emphasis on Mathematics

- A majority (61 percent) the reporting students agreed with the statement that their school placed about the right amount of emphasis on teaching mathematical skills.
- Thirty-seven percent agreed with the statement that more emphasis should be placed on the teaching of math.

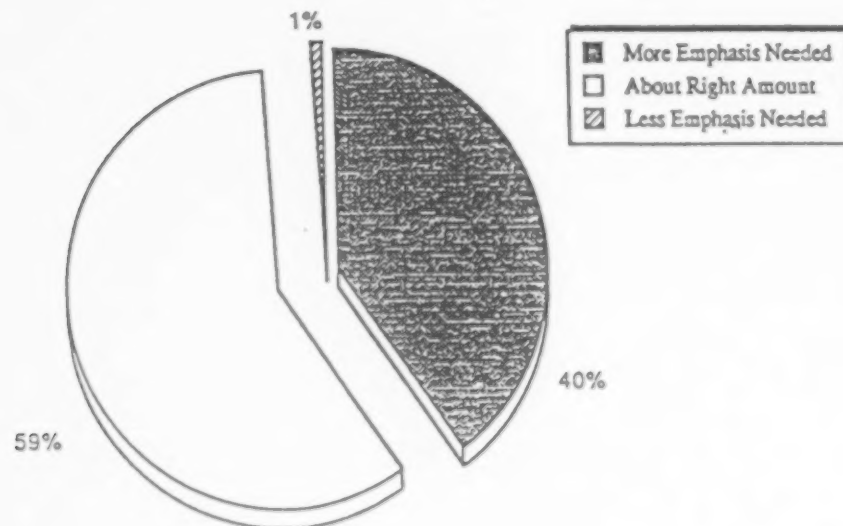
Figure 10
Student Perceptions of the Level of Emphasis on Math and Computational Skills
Needed in Their Vocational Program
(N=119)



Emphasis on Communication

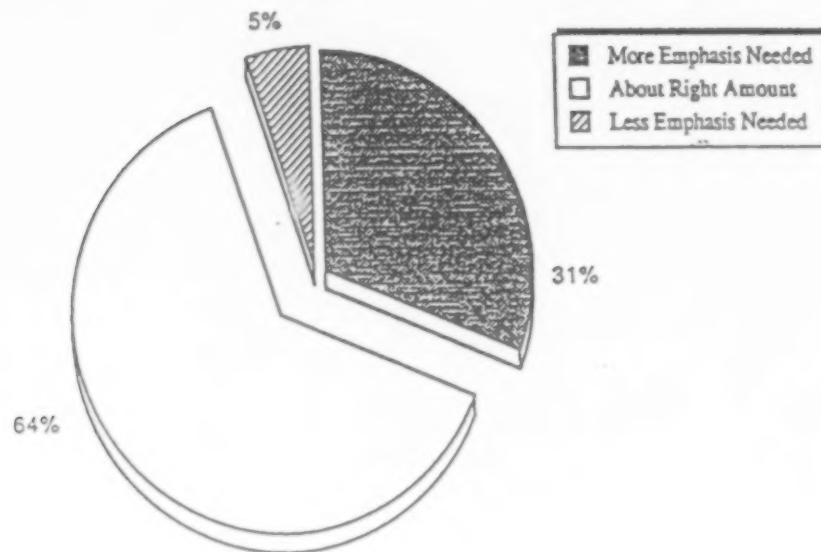
- Fifty-nine percent of the vocational completers indicated that the vocational teachers in their school placed the right level of emphasis on reading and interpreting technical materials.
- About 40 percent of reporting vocational completers thought more emphasis should be placed on reading skills in their vocational programs.
- One percent of the students thought that their vocational programs should place even less emphasis on applied reading skills.

Figure 11
Student Perceptions of the Level of Emphasis on Reading and Interpreting
Technical Information Needed in Their Vocational Program
(N=119)



- More than one-half (64 percent) of the students felt that their vocational teachers placed the right amount of emphasis on technical writing including business letters and reports.
- Thirty-one percent felt more emphasis should have been placed upon teaching these skills.

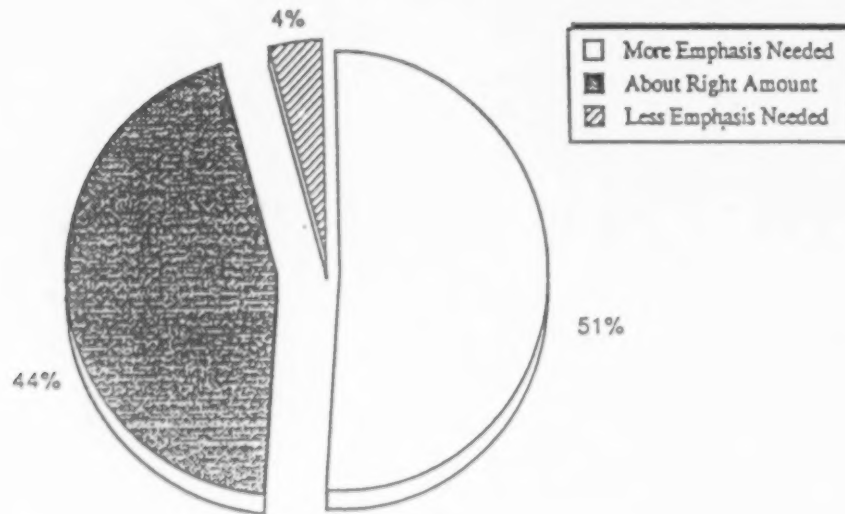
Figure 12
Student Perceptions of the Level of Emphasis on Technical Writing
Needed in Their Vocational Program
(N=119)



Emphasis on Science

- A majority of students (51 percent) felt that their vocational teachers should have placed greater emphasis on teaching scientific principles in an applied setting.
- Forty-four percent felt that their vocational program had the right amount of emphasis on applied science. The remaining 4 percent indicated that they felt less emphasis in science was needed.

Figure 13
Student Perceptions of the Level of Emphasis on Applying Scientific Principles
Needed in Their Vocational Program
(N=119)



Section Four

Teacher's Attitudes and Efforts Toward The Integration of Academic and Vocational Education

An additional goal of the SREB Consortium is to encourage vocational teachers to place greater emphasis on basic competencies in their vocational classes and, correspondingly, for non-vocational teachers to place more emphasis on applied learning in academic courses. As part of the evaluation effort, both vocational and non-vocational teachers were asked to respond to a personnel survey describing their attitudes, behaviors, and expectations about integrating vocational and academic coursework.

Purpose of Vocational Education

- Of 6 reporting non-vocational teachers in Jonesboro Vocational, 3 agreed with the statement that a primary purpose of secondary vocational education is to prepare youth to enter employment related to their school work with the capacity to learn on the job or in some form of postsecondary education.
- No non-vocational teachers agreed with the statement that a primary goal of secondary vocational education is the expansion of youth employment and educational opportunities by integrating academic and vocational coursework.
- Five of 11 reporting vocational teachers agreed with the statement that a primary purpose of secondary vocational education is to prepare youth to enter employment related to their school work with the capacity to learn on the job or in some form of postsecondary education.
- No vocational teachers agreed with the statement that a primary purpose of secondary vocational education is to expand youth employment and education options by integrating the teaching of higher level academic competencies with technical and occupational content.
- Another five vocational teachers thought a primary purpose of secondary vocational education is to train youth for entry-level employment.

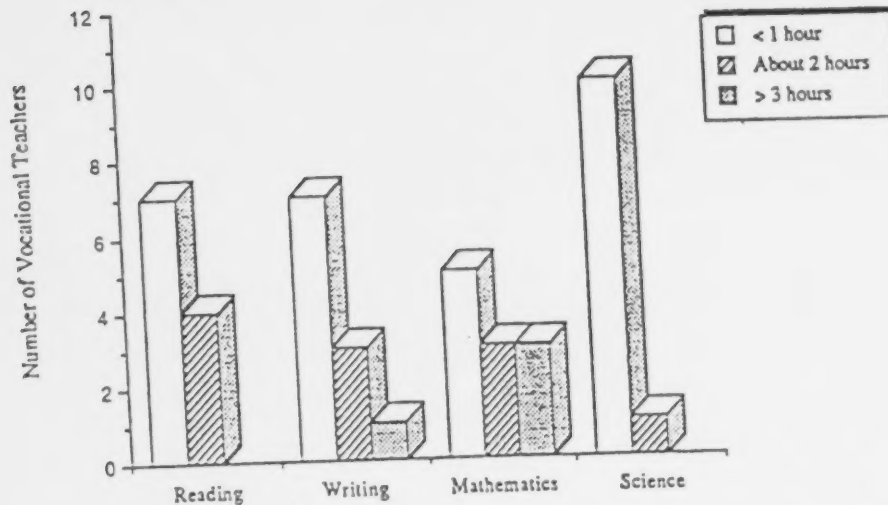
Importance of Reinforcing Academic Skills

- All non-vocational teachers indicated that it is quite or extremely important to reinforce student reading skills.
- Ninety percent of vocational teachers felt the reinforcement of reading skills quite or extremely important.
- All non-vocational teachers indicated that it is quite or extremely important to reinforce students writing skills as well.
- A smaller portion (73 percent) of vocational teachers thought that the reinforcement of writing skills was quite or extremely important.
- About seventy-three percent of non-vocational teachers indicated that it is quite or extremely important to reinforce students' math skills, and approximately the same percentage found the reinforcement of science quite or extremely important.
- All of the vocational teachers agreed that the reinforcement of math skills is extremely or quite important, while 91 percent felt the teaching of science skills was extremely or quite important.
- On average, Jonesboro non-vocational teachers and vocational teachers both felt that the learning of academic skills in a vocational context was quite important.

Teacher Effort Toward Integration

- Of the 6 reporting non-vocational teachers, 3 had subject concentrations in areas other than mathematics (see figure 14). Of these, 2 teachers spent over three hours per week reinforcing student math skills, and one teacher spent less than one hour per week reinforcing student math skills.

Figure 15
Amount of Time Spent Per Week by Vocational Teachers
Reinforcing Academic Skills
(N=11)

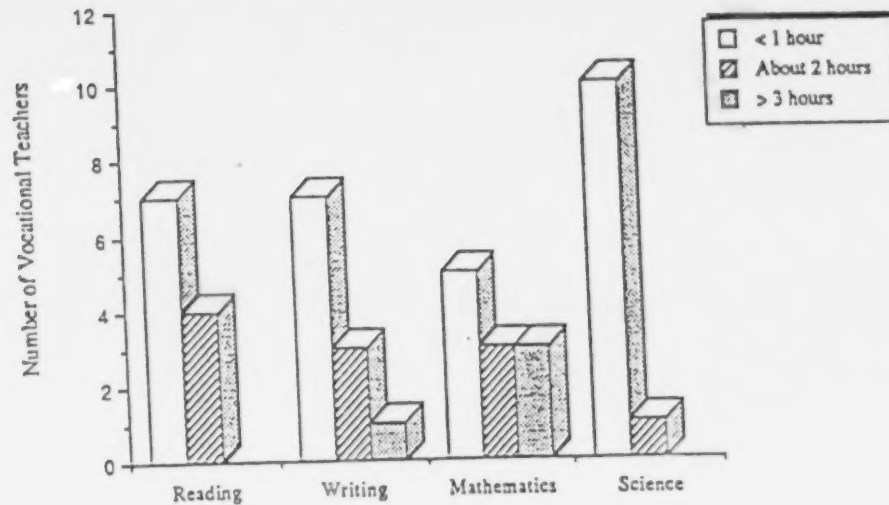


- Among vocational teachers 10 of 11 spent less than one hour a week on science skills, and one spent about two hours with students teaching science skills.
- Among vocational teachers 4 of 11 teachers spent about two hours per week reinforcing student reading skills, while 7 teachers spent less than one hour a week on these skills.
- Seven of 11 vocational teachers spent less than one hour per week reinforcing student writing skills, and 3 spent about 2 hours per week on these skills

Teachers' Perceived Abilities

- Approximately 50 percent of the non-vocational teachers said that they could reinforce students' reading and writing skills well or fairly well.
- Among vocational teachers 73 percent said that they could reinforce student's reading skills well or fairly well, and all said they could reinforce writing skills well or fairly well.

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- Sixty-four percent of all vocational teachers, and 100 percent all non-vocational teachers said that they could reinforce student's math skills well or fairly well.
- Half of the non-vocational teachers reported that they could not teach science skills, or could not teach them very well.
- Seventy-three percent of the vocational teachers indicated that they could teach science skills well or fairly well.
- Both vocational and non-vocational teachers were fairly confident about their ability to integrate academic and vocational curriculum.

Communication Between Teachers

- Slightly more non-vocational teachers report spending time meeting with vocational teachers to discuss and prepare instructional activities, than do vocational teachers report spending time meeting with non-vocational teachers.
- Fifty percent of non-vocational teachers report not meeting with vocational teachers. Seventeen percent report meeting with vocational teachers only once a month or less.
- Sixty percent of vocational teachers report not meeting with non-vocational teachers to prepare and discuss instructional activities. Ten percent report meeting with non-vocational teachers once a month or less.

Chemistry	Chemistry I. General
	Chemistry II. Advanced
Physics	Physics. General
	Physics. Advanced
Other Science	Science. Other
Remedial Math	Remedial Math
Applied Math	Applied Math
	Business Math
	Consumer Math
	Vocational Math
Algebra I	Algebra I
Algebra II	Algebra II
Algebra	Algebra I
	Algebra II
Geometry	Geometry
Advanced Math	Trigonometry
	Calculus
Other Math	Math. Other

Section Four

In addition to the other surveys administered, a secondary school personnel survey was completed by administrators, counselors, vocational and non-vocational teachers at each participating SREB site. The low number of administrators and counselors responding to the survey, however, precludes analysis of this data for reasons of confidentiality and problems with generalization. Consequently, the data presented in this section are presented only for vocational and non-vocational teachers from each site.